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THE FOUNDRY

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THE FOUNDRY for November

A Mistake CONTINUED

REAL apprehension is expressed by those of industry who have been working continuously since June in the preparation of codes under NRA. This arises from regulations issued by General Johnson under date of Oct. 19 and sent to district compliance boards established under the pressure of publicity and the stimulation of public sentiment incident to the blue eagle campaign. These regulations, although stated to be effective until a permanent government code compliance system is established, are mischievous and dangerous. They will foment discord and confusion. That the system of local committees on national measures should be established at all is a mistake and to continue it a day in relation to industry code administration is an affront to the self-governing rights and abilities of each branch of industry. Industry regulation by codes should not be complicated by local tampering.

Invitation TO SNOOPERS

THE regulations furnish full facilities for complaining employes, competitors or plain garden variety snoopers to throw a brick at any manufacturer working under a code. Complaint forms are provided at government expense at main post offices, thus making the operation of filing complaints easy if not a positive pleasure. These are to be sent to local compliance committees, occasionally numbering a manufacturer or two, but usually embracing merchants, lawyers and local labor leaders. Probably not many of any such district compliance board ever met a payroll and few have any manufacturing background. These men are appealed to by the complainant, who may even remain anonymous and secure the committee's attention. If the NRA has specifically instructed the local committee to do so, the complaint may be refered to a particular agency of industrial self government—a code authority, perhaps. If no such instructions from Washington are on hand, or if no response from the "particular agency" is forthcoming, the district committee summons the manufacturer complained against—respondent to them—and endeavors by suasion to secure an adjustment. Strict injunctions are issued against the district boards acting in an investigating, judicial, capacity—but anyone familiar with the work of local committees on fund drives etc. can picture the small deterrent such instructions will offer to an officiously inclined local light imbued by zeal and the enhanced self-esteem of a quasi-governmental post.

Round About to WASHINGTON

FAILING in this procedure to obtain compliance, in the judgment of the local committee, the matter is referred to Washington. The official next in line is the national compliance director who in turn calls upon the divisional administrator of the industry concerned. The latter also may decide to attempt adjustment through some appropriate agency of industrial self-government. Then, in event of continued dissatisfaction on the complainants side of the argument, the matter goes back again to the national compliance director who may undertake further attempts with the rugged respondent, recommend exceptions to the administrator, call a public hearing, snatch the blue eagle from the respondent and tell the public about it or recommend to the federal trade commission or the attorney general that the punitive responsibilities of those agencies be put to work. Quite aside from all considerations of injecting local animosities, promoting busy-body complaints and setting up cumbersome and expensive machinery into the operation of code authority, the plan is wrong. It is unfair to every obligation given or implied by NRA that industry should in full measure be self-governing within the law.

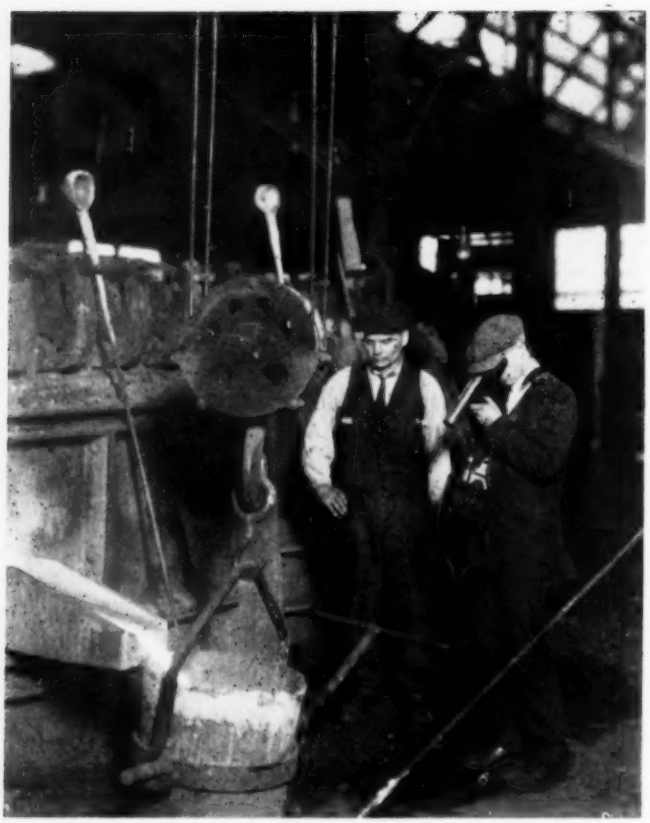


Fig. 1—Close metallurgical control and good plant housekeeping are features of the malleable foundry

Ohio Brass Co. Keeps Plant Clean

By FRANK G. STEINEBACH

GOOD housekeeping in all departments of its large plant, devoted particularly to the manufacture of electrical equipment, has been a carefully planned program of the Ohio Brass Co., Mansfield, O., for years. While that company, since its inception, has prided itself in the clean and orderly appearance of its various shops, which at present include brass and malleable foundries, machine shops, plating, polishing and assembling departments, physical and chemical laboratories, pattern shops, etc., the past 7 or 8 years has witnessed the active campaign which has enabled the company to provide an exceptionally clean and orderly plant where workmen perform their tasks in pleasant and healthful surroundings.

Grounds and buildings share alike in presenting a pleasing appearance of marked cleanliness and orderliness. Numerous plant buildings are located over a rather wide area on the outskirts of the city. Three trunkline railroads enclose the land on which the plant is located, thus providing excellent shipping facilities and at the same time setting off the grounds from the surrounding territory. Driveways and walks are built throughout the grounds, shrubbery has been planted along certain walks and buildings and the unoccupied land all has been sodded. The pleasing appearance of the entire plant property is accentuated by the entire absence of rubbish of any kind.

Interiors of buildings show the results of a definitely planned good housekeeping program. For example, in the foundry buildings, walls and the structural members of the building are clean. In addition to routine cleaning methods, the interior surfaces of the buildings are given a complete cleaning when the plant is closed down for the inventory period. Gangways are entirely free from materials of any kind; excess supplies such as flasks, bottomboards, clamps, etc., are nowhere in sight, and all parts of the shop are free from refuse as well as materials not in use. The floor around the furnaces is clean at all times. In fact the system of plant housekeeping functions so smoothly that the shop presents the appearance of absolute order and as near perfection in the way of cleanliness as it is possible to attain in a foundry, within a few minutes after the day's run has been completed and the molders and other foundry workers

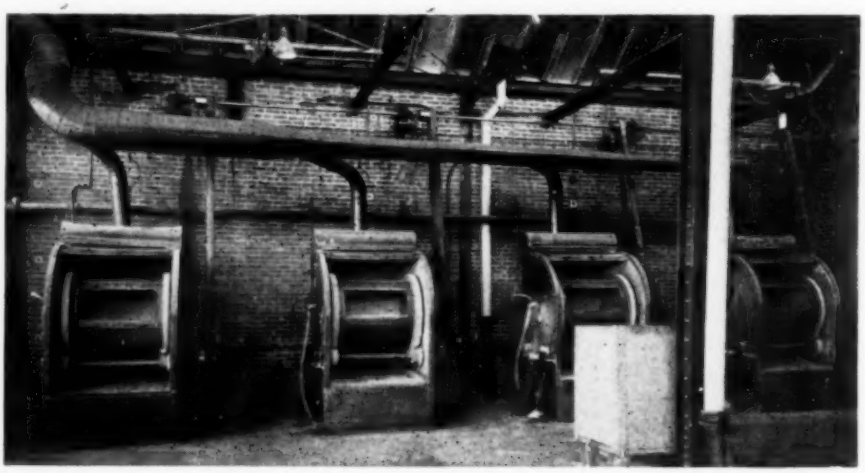


Fig. 2—Each sandblast machine is equipped with a ventilating pipe leading to the dust arrester located outside of the building

have finished their work and left the building.

The question naturally arises as to the governing factors contributing most to the ultimate success of the good housekeeping program. Men in the shop—workmen, foremen and supervisors—are emphatic in crediting the management of the company for the march of progress, citing a willingness to spend both time and money to provide the necessary facilities and to undertake the required educational work to put the idea over. At the same time, company officers praise the co-operative endeavors of the entire plant personnel, especially the foremen who must assume much of the responsibility for operating the plan. In all probability, a combination of exceptional leadership on the part of management coupled with a willingness on the part of the workers to co-operate to the fullest extent, has laid the foundation for the splendid accomplishment.

Functions Under Personnel Manager

Recognizing the close relationship existing between good plant housekeeping, safety, health and the elimination of waste, the management has organized the campaign to include all of these factors. The entire program functions under the direction of the personnel manager of the company, whose close contact with the foremen and plant personnel permits the proper coordination of activities to avoid duplication of effort. A plant custodian, who is responsible to the personnel manager for the plant housekeeping program, in turn directs the foremen of the various departments. In all instances the work of keeping the plant clean and orderly rests squarely with the foremen.

Three committees, with a membership consisting of a chairman and three plant foremen, have been appointed to cover the plant housekeeping, waste and safety campaigns. Of the three, the good housekeeping committee may be considered of most importance and of greater service to the remaining two, for it must be realized that a clean and orderly plant certainly points to greater safety for workmen, and to the elimination of wasteful practices, which over a period of time add considerably to the cost of manufacture.

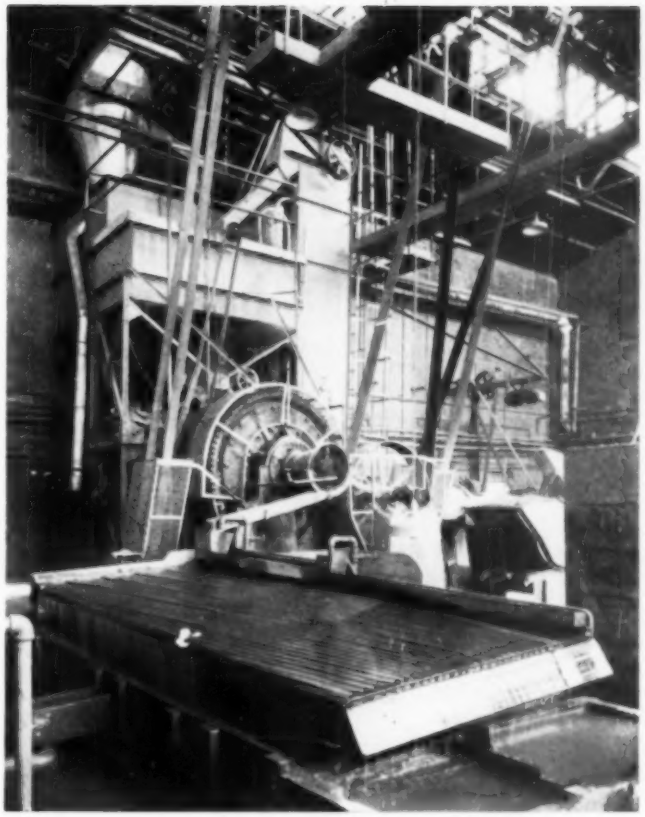


Fig. 4—All equipment in the recovery plant is well protected with dust collectors

Each committee makes a monthly inspection of the entire plant and prepares a report to departments which may not be maintaining the standards establishd for the organization. Any laxity in effort then is called to the attention of the foreman of the offending department and he is required to see that proper steps are taken to correct the difficulty. The duties of the plant custodian are such as to compel him to spend a considerable portion of his time moving throughout the plant. He thus maintains an almost constant inspection and therefore has an opportunity of calling infractions to the attention of the foreman between inspections of the committee.

Interest in the good housekeeping program extends through the officials of the company and it is not unusual for one or more of the officers to make unexpected visits to the plant at rather frequent intervals. Any conditions which are not in the best interests of the good housekeeping program usually are

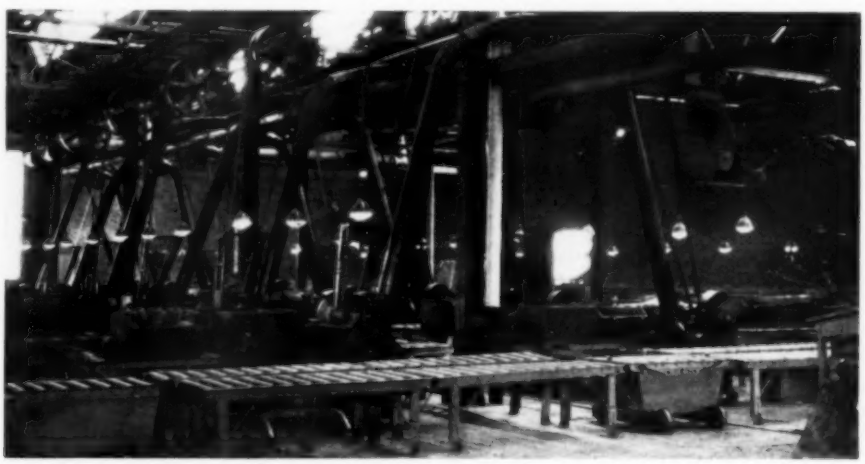


Fig. 3—Over three-fourths of the grinding wheel is enclosed in a hood which is provided with an exhaust pipe leading to the main duct

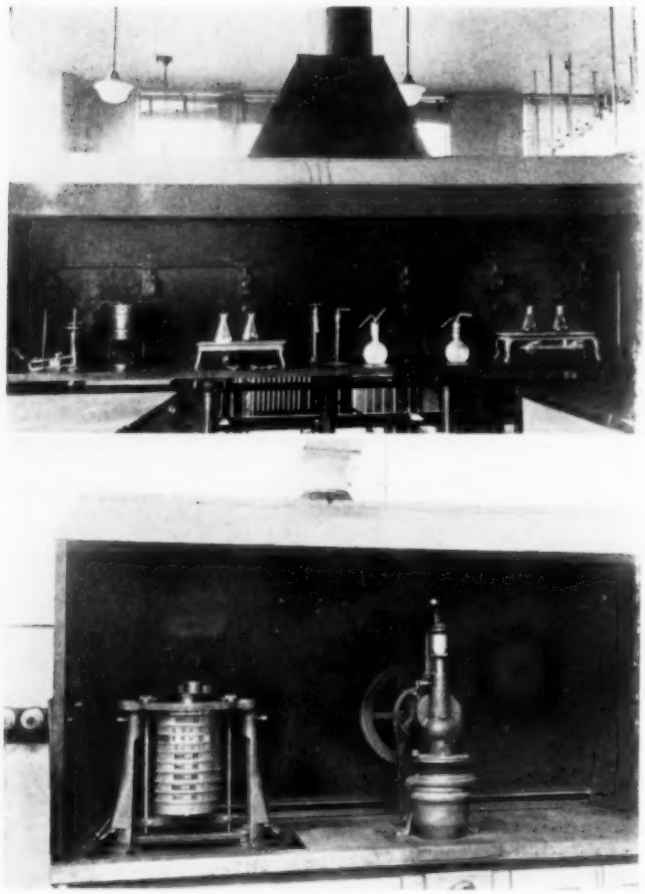


Fig. 5 (Above)—A blower provides positive suction for hoods in the chemical laboratory. Fig. 6 (Below)—A sand machine and coal pulverizer are located under a hood

brought to the attention of the foremen at their regular meeting held the first Monday in each month. The management has provided three cups to be awarded at the end of the year.

The actual functioning of the individual departments in meeting the established standards also presents several points of special interest. Undoubtedly, the question of cost is of vital importance to all foundry managers interested in maintaining a clean and orderly plant. Therefore, it is comforting indeed to have the information that no supplementary janitor service is provided in either the brass or malleable foundries of the Ohio Brass Co., and that all of the routine work of housekeeping is performed by the workers in the particular department at times when they otherwise would find a lull in their respective duties.

For example, the core carrier, who brings the cores from the core department to the molding floors, has a few minutes lull in his work now and then during the day. At such times he is required to clean up around the core racks and to remove any dirt or refuse resulting from his particular work. The pouring gang and the shakeout crew in the brass shop function in the same manner, and keep that portion of the shop in which they are working orderly and clean. Each molder is responsible for keeping his floor clean. The foreman is charged with the responsibility of seeing that each workman performs this duty as the need develops. If the follow through is not complete, the foreman will hear about it shortly, either through the custodian or the good housekeeping committee.

In contrast to the procedure in the brass foundry where the molds are carried on conveyors from the molding machines to the pouring station and the shakeout, molds in the malleable foundry are placed on the floor and poured. In that department a labor crew consisting of five men also assists in the cleanup work. Under the direction of the foreman, this crew cleans the gangways and the space around the air furnaces.

Molders Shake Out Castings

Molders in the malleable shop shake out castings on their own floors and stack the castings for the labor crew to knock off the gates and transport them to the annealing department. Following the shakeout of the morning heat, the molder wets down his sand. It then is piled by the laborers and is prepared with a sand cutting machine for use in the afternoon. After the afternoon heat has been shaken out, the molder wets down the sand and it then is piled and prepared by the operator of the sand cutting machine.

The value to any foundry of the old adage of a place for everything and everything in its place is emphasized in both foundries. Orderliness is possible in the foundries of the Ohio Brass Co. chiefly because the management has provided a place for the storage of necessary equipment such as flasks, bottom (*Please turn to page* 42)

Fig. 7—View of melting department in the brass shop. This floor is kept clean at all times

Foundries Do Their Part

Administration problems confront industry following application of code provisions

ACCORDING to the announced intention of the National Recovery administration, all industry codes will be definitely set up and approved prior to December first. The deputies and their assistants have had this objective impressed upon them with the further advice that subsequent to that date their full time and attention will be occupied by the administration of the codes.

Accordingly, although no one of the four foundry industry codes had been approved on Nov. 1, it is reasonable to expect that the setup on all will have been made within the month. Slight differences in the steel and malleable castings codes were the subject of conferences following the public hearings on these two codes. The administrator must secure the approval of each of the five advisory divisions, labor, industry, consumer, legal, and planning and research, before transmitting each code to General Johnson for presenting for presidential okey. This procedure accounts for the lag between the public hearings and the date of final approval.

Covers Nonferrous Foundries

The nonferrous code upon which the public hearing was held Oct. 27, as reported on page 29 of this issue, differs slightly in organization form from the two previously mentioned. In addition to the broad general grouping covering all jobbing nonferrous castings, separate group codes covering sand casting, permanent mold aluminum, blast furnace rolling mill and steel plant castings were presented with the code. Other supplemental codes probably will follow.

The gray iron foundry code was set for public hearing Nov. 9. The industry as represented in the presentation of this code is designated as covering gray iron jobbing castings. Groups having a common interest may set up subdivisions and supplementary codes subject to the basic gray iron code. The minimum wage for common labor in the south is set at 25 cents per hour, while in the north the range is from 37 cents in cities of 25,000 population or less to 40 cents in cities having a population of 500,000 and over. Minimum wages for office and salaried employes also are carried. Selling below cost supplemented by provision for recognized cost accounting methods, contract provisions, terms and protection against limited specification on large contracts are provided in the fair practice provisions.

With the four basic codes of the foundry industry established and recognized, the administration problem confronts those who have been given the responsibility for forming or changing their trade associations to comply with the provisions of the NIRA. Each of the codes contains the customary provision for a code authority designated by the industry, with non-voting representation by appointees of NRA. This administrative body should and undoubtedly will be set up and ready to function promptly in each industry.

Authorities To Settle Disputes

The code authority in each case is backed by the power of the administration as represented by the administrator who will be designated to handle and adjudicate complaints referred to him by the industry. The need for prompt functioning in this regard is evident, due to the fact that until such organization is able to serve for the industry, district compliance boards active under the PRA blue eagle division and now in operation in practically every large center, have definitely been given authority to handle complaints even under approved codes.

Those who have devoted so much time and attention to the relationship of the foundry industry to the NRA, and can appreciate the problems which will arise with the effective dates of these codes, desire to conserve to industry all measures of self control and administration that may be within their power. Many are definitely of the opinion that to permit the assumption of arbitrary policing powers by local compliance boards, formed in many cases by merchants, lawyers and local labor leaders, can be avoided only by each industry assuming its control authority promptly and handling all disputes within the trade groups. Of course, under the provisions of the act, the administrator in each case is the court of final (*Please turn to page* 46)

Molding Condenser Castings

Flask equipment designed for castings outside of usual range pays dividends

By J. H. EASTHAM

A CERTAIN amount of fascination attaches to the idea of making a casting or series of castings heavier or of greater area than any previously produced, particularly where a shop has been laid out for the manufacture of smaller castings of a peculiar type and consequently lacks flasks and other equipment for handling larger work.

In one instance of this kind the owners of a new foundry designed and erected for the production of a special line of small castings secured an order for six packing house tanks or condenser castings presenting certain distinctive features which demanded a carefully thought out plan of action. The volume of each unit was a greater factor than the actual weight involved.

Unit Included Three Castings

As shown in Fig. 1 the assembled tank was made up of three castings, one open at both ends, and two closed at one end. The length of each piece was 6 feet 7 inches, width 3 feet 3 inches and depth 30 inches. The thickness of the side and end walls was 1-inch and that of the closed ends 1½ inches. Weight of the center section was 1600 pounds and that of the closed end units 2500 pounds.

Fig. 4 in plan and section shows that the bottom flange was made fast to the shell. The top flange was loose and attached in sections by dowel pins. A 4-inch square reinforcing member was screwed securely to the shell around the top of the pattern on the inside. This style of construction guaranteed the rigidity of the vertical slats and prevented distortion. Also it seemed to indicate that the patternmaker had longevity and resistance to wear and tear more in mind than he had facility in molding.

With this method of construction a parting had to be made at the upper face of the bottom flange—the cheek or middle part of the mold had to be rammed concurrently with the body core. After the cope was lifted off the upper flange pieces had to be drawn and the cheek part of the mold hoisted bodily from the pattern. A taper of ⅛-inch per foot of depth provided a little working clearance.

A note accompanying pattern and blueprint requested castings as near the estimated weight as possible. Castings from a previous source, in some instances, were 60 per cent over weight. The foundryman had used wood flasks and had not taken into consideration the tremedous pressure exerted on the walls of the mold.

The problem in connection with our contract was how to make a profit on an order for six castings; what equipment could be justified on the proviso that it could be used later for other jobs and afterward not regarded as frozen assets to be shown in periodic inventories as in existence but nonproductive. Decision finally settled on the construction of a lifting plate, a cast iron flask and four combination binder bar weights. The lifting plate, cast in an open sand mold and shown in detail in Fig. 2 was beveled on the inside with the feather edge 1-inch distant from the outer face of the lower flange on the tank pattern. Also the plate was provided with lifting lugs on the outside and gaps near one end for clearance space around the inlet gates.

Iron Flask in Four Parts

The flask, in four parts, one 7-inch cope, one 7-inch and two 10-inch cheeks, was built from cast iron flanged plates in which the end sections fitted inside the side plates. Thus the flasks might be dismantled and reassembled at any time and to any desired shorter length by moving the ends inward. Skeleton frame patterns were required for the side and end plates, which with the cope bars were molded and cast in open sand molds by an apprentice. Later, guide pin holes were drilled in the flanges. All bolt holes were cored.

With all the equipment in readiness, a coke bed approximately the area of the tank mold was laid about 12 inches below the floor level and suitably piped at two corners to allow easy escape of the gas generated when pouring the four closed end castings. Space above the coke was filled with sand which then was rammed

and struck off level with the floor. The tank pattern was set up on this bed. Sand was rammed on the inside of the pattern and on the outside up to the upper face of the flange where it was struck off to form a bed for the lifting plate. The plate was lowered to place and firmly bedded down on the joint before the 1-inch space between the inside feather edge of the plate and the outer edge of the flange, was slicked and strewn with parting sand in the usual way. The three-part cheek, bolted through the flanges, was adjusted on the plate in such a manner that the thickness of sand between pattern and flask was approximately uniform all around.

Explain Molding Detail

Two long gate pins designed to form openings leading to inlet gates on the bottom flange at one end, were set in place. Sand then was rammed against the outside of the pattern and the inside simultaneously. Two rows of long gaggers, as shown in the sectional view of the finished mold Fig. 3, were placed over the flange, with the long shanks leaning against the walls of the flask. These gaggers carried the overhang between the edge of the plate and the vertical wall of the pattern. A few straight rods laid on the plate in the neighborhood of the gate pins, interlaced with several dozen gaggers, carried the sand over the two gate clearance gaps in the lifting plate.

Vertical stake rods also shown in Fig. 3 were driven into the foundation sand inside the pattern to stiffen the body core. The tops of the rods extended to within 2½ inches of the top of the pattern. This arrangement allowed sufficient clearance later when sweeping out the plate forming the closed end of the casting. Rows of short rods—not shown—were laid horizontally around the inside with their outer ends 1-inch from the pattern and about 5 inches apart.

Suitable facing sand packed up thinly on both the inside and outside faces at each ramming course and backed up with floor sand in accordance with good foundry practice, contributed materially to the excellent face secured on the castings.

At the proper time the horizontal strengthening ribs were dowel pinned and bedded in their respective places on the outside face of the pattern. Two rows of gaggers were laid over them as with the lower flange. To prevent displacement two courses of sand were rammed over them before the dowel pins were withdrawn.

With the sand on the inside and on the outside within 4 inches of the (*Please turn to page* 40)

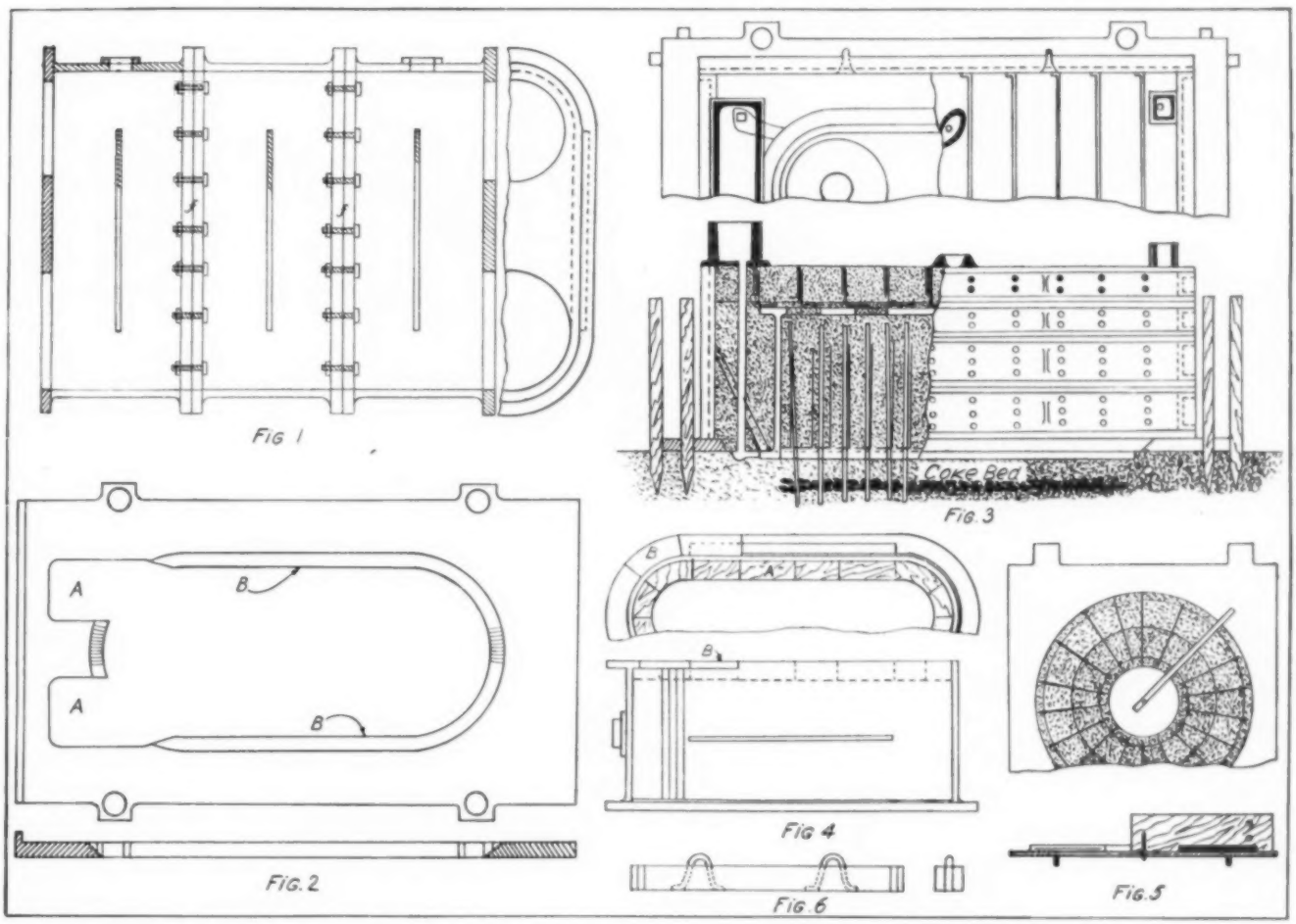


Fig. 1—Assembled tank in three pieces. Fig. 2—The lifting plate. Fig. 3—Plan and sectional view of mold of closed end section. Fig. 4—Showing detail of pattern construction. Fig. 5—The core was swept on a plate. Fig. 6—Combination weight and binder bar

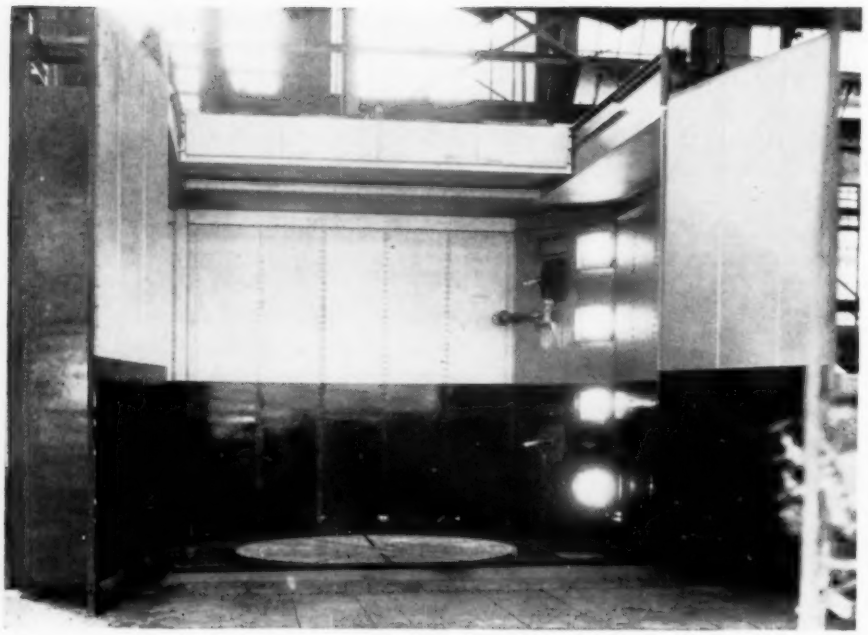


Fig. 1—Front doors are operated by hydraulic cylinders while the three-panel, sliding type door on the roof is moved by an electric motor

Cleans Steel Castings by Washing

Bucyrus-Erie Co. uses water under pressure of 400 pounds per square inch to remove sand

THROUGH the installation of new equipment in its steel castings cleaning department and the rearrangement of the sequence of cleaning operations, the Bucyrus-Erie Co., South Milwaukee, recently has accomplished an important step forward. The project was undertaken by the management of that company primarily to provide more comfortable conditions for its employes in that department. In this, the program has succeeded for dust and heat encountered in knocking out cores and removing adhering surface sand has been reduced to an exceedingly low degree.

The Bucyrus-Erie Co., with plants at South Milwaukee, Erie, Pa., and Evansville, Ind., specializes in a complete line of excavating machinery, shovels for steam, electric, gasoline or diesel engine operation, dredges, blast hole drills, railway cranes, and a small general utility crane, mounted on wheels or crawlers, for industrial use. Steel castings, ranging in size from small gears to large revolving frames weighing 15 tons, are used in the manufacture of the various types of equipment. These castings are produced at the South Milwaukee plant of the company. Metal is melted in both electric and open-hearth furnaces.

The company maintains two cleaning departments, located in separate buildings, but the operations in one are practically a continuation of the work performed in the other. The department in which the first cleaning work is performed is located in one end of the main foundry bay in a space approximately 58 x 170 feet. The second room is 65 x 255 feet. Castings are transported from one building to the other on standard gage railroad cars shunted by a switch engine.

Before the recently completed changes in practice were undertaken, the sequence of operations in the cleaning departments was as follows: Castings were shaken out by the night crew in a floor area of the main foundry bay between the cleaning department and the molding floor. Larger castings, such as the revolving frame for an excavator shown in Fig. 5, are ribbed and boxed to provide the necessary strength with minimum weight. That design of course increases the cleaning labor, since cores and sand which has been baked hard by the temperature

of the molten metal must be removed from the pockets and boxes. Previously core sand, core rods and gaggers were removed by a crew of men using pneumatically operated pokeout bars. On the 15-ton casting shown in Fig. 5, that operation required approximately 35 hours of labor.

Cleaning Practice Has Changed

Following that operation, the castings were placed in a room for pressure blasting, and then were taken to the cutting floor where the gates and risers were removed with an oxyacetylene torch. At that point in the operating procedure the work was divided on the basis of the size of the casting. Larger castings remained in the same bay, since the large annealing furnaces are located there, while the smaller castings were transported to the other building. Following the cutting operations, the castings were chipped, ground and in some instances tumbled, annealed, pressure blasted for the second time, and finally shipped.

Practice in the cleaning department has undergone marked changes following the installation of equipment for removing sand, gaggers and rods hydraulically. Now all steel castings, large and small, produced by the company, are taken directly from the shakeout floor, which incidentally has not been changed, to the washing equipment, located immediately adjacent to that floor. There the application of water under pressures ranging from 300 to 400 pounds per square inch cleans the castings in a comparatively short time. For example, the previously discussed bed frame casting, shown in Fig. 4 which weighs 66,000 pounds as it comes from the mold with sand, cores, gaggers, rods, gates and risers included, and tips the scale at 30,000 pounds when ready for shipment, can be cleaned in from 1½ to 2 hours. The task of poking out sufficient sand so that the crane can be hooked on, loaded on the cleaning table and unloading after washing consumes 30 minutes. Handling and cleaning requires three men, the craneman, hookman and room operator.

Not only has this practice eliminated the dirty process of poking out, but it also has made it unnecessary to blast the castings previous to flame cutting. Smaller castings are placed in steel baskets following the shakeout for transportation to the washing room and hence to the flame floor. The basket is placed on the rotary table and the castings are not removed during the washing operation. The company has built special racks of crane (*Please turn to page* 60)

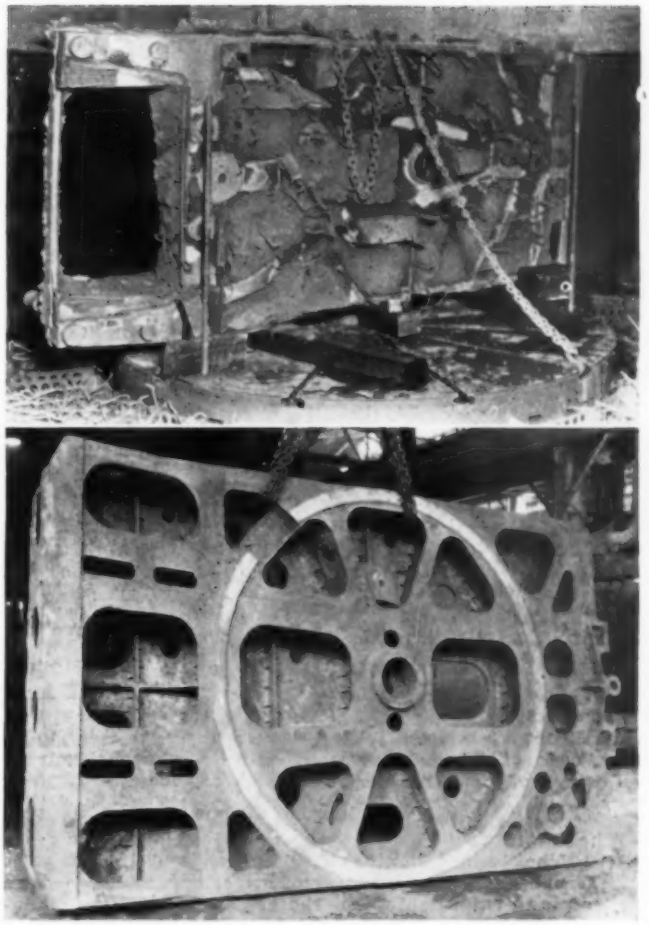


Fig. 4 (Above)—Appearance of a large steel casting as it comes from the shakeout. Fig. 5 (Below)—A 15-ton revolving frame which is ribbed and boxed, thus increasing the difficulty of removing sand

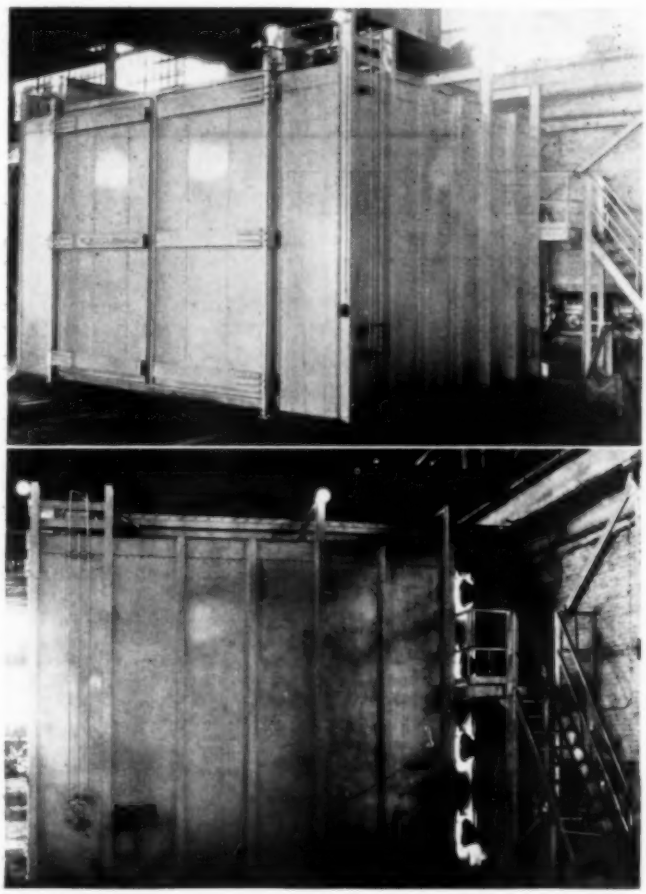


Fig. 2—(Above)—Control for front and top doors is placed near the front of the unit. Fig. 3 (Below)—The operator may direct the stream from either the upper or lower stations

Nonferrous Foundry Association Code

Supplements submitted to the administrator by several divisions within the industry

NONFERROUS Foundry Association for Industrial Recovery on Oct. 13 presented a revised code of fair competition of the nonferrous foundry industry to the National Recovery administration at Washington. The formal hearing on the code was held Oct. 27, as reported on page 29 of this issue of THE FOUNDRY. The code as submitted is as follows:

To effectuate the policies of Title I of the National Industrial Recovery act, the following provisions are established as a code of fair competition for the nonferrons foundry industry and shall be binding upon every member thereof.

1. Definition of Terms

The terms used in this code are defined as follows:

(a) The term "the industry" means and includes the business of producing nonferrous castings as hereinafter defined, and such equipment thereof as is regularly manufactured in plants of members of the industry, and selling such castings in the open market in competition with similar castings and not as parts of other objects having a recognized trade classification. Provided, however, that such term does not include the producing and selling of such castings when sold to an affiliated or parent corporation or company for ultimate use as a part of any other article, including finished parts thereof, produced by a parent or affiliated corporation or company; and provided further, that such term does not include the production of railroad (not street railway) car and locomotive journal bearings and castings; and provided further, that such term does not include the production of the castings; and provided further, that such term does not include the production of aluminum alloy piston castings.

The term "affiliated corporation or company" means a corporation or company connected with another corporation or company through stock ownership by a common parent corporation or company, if at least 51 per cent of the stock of each such corporation or company (except such common parent corporation or company) is owned by such parent corporation or company either directly or indirectly through at least 51 per cent stock ownership in another corporation or company or other corporations or companies.

The term "parent corporation or company" means a corporation or company which owns at least 51 per cent of the stock of another corporation or company.

For the purpose of these definitions, the term "stock" does not include nonvoting stock.

The industry embraces two main groups of castings which are "Miscellaneus Nonferrous Castings" and "Specialty Nonferrous Castings."

(b) The term "Member of the Industry" includes anyone engaged in the industry as above defined, either as an employer or on his own behalf; provided, however, that organizations or groups of members of the industry representing a substantial part of any branch or division of the industry may be exempted by the administrator from the provisions of this code as provided for herein.

(c) The term "Nonferrous Castings" means castings made in the industry from aluminum, antimony, bismuth, cadmium, cobalt, copper, lead, magnesium, nickel (except nickel chromium alloys containing more than 5 per cent of chromium) tin, zinc, and their alloys containing less than 50 per centum of iron, produced by any process.

(d) The term "Miscellaneous Nonferrous Castings" means that group of nonferrous castings produced in the rough or partially machined or finished by a member of the industry to the order of the buyers from the buyer's designs and specifications.

(e) The term "Specialty Nonferrous Castings" means that group of cast nonferrous products in the rough or partially machined or finished, designed and engineered by members of the industry producing them, produced from patterns and/or other production equipment belonging to the producer.

(f) The term "the Association" means Nonferrous Foundry Association for Industrial Recovery.

(g) The term "the Board of Directors" means the board of directors of the association.

(h) The term "Employes" as used herein includes anyone engaged in the industry in any capacity receiving compensation for his services, irrespective of the nature or method of payment of such compensation.

(i) Population for the purposes of this code shall be determined by reference to the 1930 federal census.

2. General Regulations

Members of the industry will comply with the following specific provisions:

(a) That employes shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from interference, restraint, or coercion of employers of labor or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or portection.

(b) That no employe and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing; and

(c) That employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment, approved or prescribed by the President.

3. Regulations of Hours of Work

(a) No member of the industry shall cause or permit any employe to work in excess of 40 hours per week, subject to the following exceptions:

(1) In peak periods of production employes may be employed not to exceed 48 hours per week for a period of not more than 4 weeks in any 6 months and not more than 6 days in any one week.

(2) Melters, engineers, and firemen, the number (in no case less than one) of whom employed by any member of the industry shall not exceed 3 per cent of the total numbers of its employes, may be employed not more than 10 per cent longer hours than other factory employes.

(3) Repair-work employes to the extent required by an emergency, may be employed not more than 10 per cent longer hours than other factory employes.

(4) Watchmen may be employed not more than 56 hours per week.

(5) All executives employed primarily in directing or supervisory capacities and in technical work, and members of their respective staffs, individually receiving pay at the rate of $35 or more per week.

(6) Outside salesmen and outside service men.

(7) In emergencies where the safety of the men or the protection or preservation of the property necessitates longer hours.

(8) Whenever sufficient employes qualified for any type of work are not available to any member of the industry in a particular locality such hours of labor may be increased to the extent required by such member of the industry to perform such work, but compensation for such increased hours shall be at the rate of one and one-half times the regular hourly rates.

(b) The industry recognizes the desirability of and accepts the principle of the 8 hour working day for labor and insofar as it reasonably can, the industry will endeavor to employ its labor on that basis.

(c) After the date of the employment by any member of the industry of any employe such member shall not permit such employe who shall also have performed work for one or more other employers to work for such member such number of hours as would result in a violation of the code had all such work been performed for such member.

4. Minimum Wage Rates

Inasmuch as living conditions differ between sections of the country and for the purpose of providing for wage differentials the United States is divided into two districts hereinafter designated "North" and "South." The "North" comprises all that part of the United States except the States of North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Arkansas, Mississippi, Louisiana, Oklahoma, and Texas. The "South" comprises all of the above-named states.

(a) The minimum rate of pay per hour which shall be paid by members of the industry for male plant labor (not including watchmen, learners, minors between 16 and 20 years of age, superannuated and maimed employes) in its employ in the industry in the "North" shall not be less than 40 cents per hour, and the "South" shall not be less than 32½ cents per hour.

(b) The minimum rate of pay per hour which shall be paid by members of the industry for watchmen, learners, minors between 16 and 20 years of age, superannuated and maimed employes shall not be less than 80 per cent of the minimum rate of pay as hereinbefore specified in paragraph (a) of this section.

(c) The minimum rate of pay per hour which shall be paid by members of the industry for female labor in the "North" shall not be less than 35 cents per hour, and in the "South" not less than 30 cents per hour. Where women perform in all respects the same kind and amount of work as men, they shall receive the same wages.

(d) Provided, however, that in the "South" the minimum rates of pay in paragraphs (a), (b) and (c) shall not apply in any locality where for the class of labor employed the minimum rates of pay on July 15, 1929, plus 25 per cent were lower than those specified. In such localities the minimum rates for that class of labor shall be those prevailing on July 15, 1929, plus 25 per cent.

(e) The number of learners, superannuated and maimed employes employed by any member of the industry shall not exceed 5 per cent of the total number of its employes.

(f) In the case of employes performing work for which they are paid for piecework performed, the minimum rates of pay which each member of the industry shall pay for such work shall produce over any pay period an amount equal to the amount receivable over that pay period at the minimum rates of pay per hour provided in paragraphs (a), (b), (c), and (d) of this section.

(g) On and after the effective date, the minimum wage that shall be paid any member of the industry to all office and clerical employes, except commission sales people, shall be not less than $15 per week in any city of over 500,000 population, or in the immediate trade area of such city; nor less than $14.50 per week in any city of between 250,000 and 500,000 population, or in the immediate trade area of such city; nor less than $14 per week in any city of between 2500 and 250,000 population, or in the immediate trade area of such city; and in towns of less than 2500 population, to increase all wages by not less than 20 per cent, provided that this shall not require wages in excess of $12 per week. Office boys and girls shall be exempt from the provisions of this section, provided they are paid at a rate of not less than 80 per cent of the above minimum wage, and provided further, that the number of such office boys and girls shall not exceed one to every 10 persons employed in any office of any member of the industry.

(h) Where a state law provided a higher minimum wage than is provided in this code, no person employed within that state shall be paid a wage below that required by such state law.

(i) No member of the industry shall reduce the rates of compensation for employment now in excess of the minimum wages hereby agreed to and shall make an equitable adjustment of the wages of employes now receiving more than the minimum wages as provided in this code. Such equitable adjustment shall mean that differentials existing prior to the formulation of this code shall be maintained for all workers.

5. Prohibition of Child Labor

No member of the industry shall employ any person under the age of 16 years; provided, however, that when a state law specifies a higher minimum age, no person below the age so specified by such law shall be employed within that state. No member of this industry shall employ any person below the age of 18 years in any dangerous or hazardous occupation.

6. General Provisions

(a) This code is intended to be a basic code and to cover the entire industry. It is understood, however, that division of the association consisting of trade associations, groups of manufacturers representing a substantial part of any specific branch of the industry, and/or trade groups, may formulate supplementary codes of fair competition, defining specifically their division and covering such additional regulations as are considered advisable by them. These regulations, however, shall conform to the principles of the basic code. Such codes when approved by the President of the United States shall have the same force and effect as this basic code.

(b) Sections 6, 7, and 8 of this code shall not be applicable with respect to the products of the industry sold for use outside of the continental United States, which shall be deemed to exclude Alaska and the Canal Zone.

(c) No provision in this code shall be interpreted or applied in such manner as to—

1. Promote monopolies
2. Eliminate or oppress small enterprise; or
3. Discriminate against small enterprises.

(d) This code and all the provisions thereof are expressly made subject to the right of the President of the United States in accordance with the provisions of clause 10 (b) of the National Industrial Recovery act, from time to time to cancel or modify any order, approval, license, rule, or regulation, issued under Title I of said act, and specifically to the right of the President of the United States to cancel or modify his approval of this code or any condition imposed by him upon his approval thereof.

(e) Such of the provisions of this code as are not required to be included therein by the National Industrial Recovery act may, with the approval of the President of the United States be modified or eliminated as changes in the circumstances or experience may indicate.

7. Administration

(a) The administration of the code shall be under the direction of a code authority which shall be the executive committee of the association. This executive committee shall be elected by the board of directors of the association and shall consist of 6 members, no two of whom shall represent the same division, the president, vice president, and executive secretary, respectively, of the association shall be members ex officio. The executive secretary not a member of the industry, shall be the executive secretary of the code authority and shall have a vote only in case of a tie.

(b) The Administrator may appoint one representative to attend all meetings of the code authority in order that the Administrator may be fully advised regarding the operation and administration of the code. Such representative shall be without vote and shall serve without expense to the industry. Due notice shall be given to such representative of all meetings of the code authority.

(c) The expense incurred in the preparation and/or administration of the code shall be equitably apportioned among all members of the industry on the basis of total man hours of employment by each member of the industry in work in the industry as defined.

(d) The code authority shall hold itself in readiness to assist and keep the Administrator fully advised, and to meet with the Administrator's representative from time to time as requested, to consider and study any suggestions or proposals presented upon behalf of the Administrator or any member of the industry regarding the operation, observance, or administration of this code. Such code authority may from time

to time present to the Administrator recommendations based on conditions in the industry as they may develop and request modifications or additional provisions to this code.

(e) Any action taken by the code authority for the purpose of making effective the provisions of this code may be submitted to the Administrator for approval, and shall in any case be subject to the disapproval of the Administrator.

(f) The administration of provisions of supplementary codes may, with the approval of the Administrator, be through administrative agencies of the divisions, coming under such supplementary codes.

(g) Each member of the industry shall furnish to the code authority duly certified reports at such times and in such forms as may be required by it in order to administer this code.

(h) A Division having a supplementary code of fair competition applying to it, and approved by the President of the United States, may collect such statistics as referred to in the preceding paragraph and send them in compiled form to the code authority.

(i) All statistical data filed shall be confidential and the data of one member of the industry shall not be revealed to any other member of the industry except in compiled form.

(j) The executive secretary of the code authority, or his duly authorized representatives, not members of the industry, shall have access to any and all statistical data that may be furnished but only for the purpose of administering or enforcing the provisions of this code.

(k) In addition to information required to be submitted to the code authority, there shall be furnished to government agencies such statistical information as the Administrator may deem necessary for the purposes recited in section 3 (a) of the National Industrial Recovery act.

8. Supplements to Code

(a) Supplements and amendments to this code dealing with fair and unfair methods of competition affecting the several divisions of this industry may be submitted for said divisions and when approved by the President of the United States shall become a part of this code.

9. Effective Date

This code shall become effective on the first Monday after its approval by the President of the United States.

10. Termination

All provisions of this code and any modification thereof shall cease to be in effect after June 16, 1935, or sooner if the President shall by proclamation or the Congress shall by joint resolution declare that the emergency recognized by section 10 of the Act is ended.

SUPPLEMENT TO CODE OF NONFERROUS FOUNDRY INDUSTRY SUBMITTED BY THE MISCELLANEOUS SAND CASTINGS DIVISION OF THE NONFERROUS FOUNDRY INDUSTRY

To effectuate the policies of Title I of the National Industrial Recovery act, the following provisions are established as a supplemental code of fair competition for the Miscellaneous Nonferrous Sand Castings division of the nonferrous foundry industry.

1. Definition of Terms

(a) The term "Miscellaneous Nonferrous Sand Castings Industry" means and includes that division of the nonferrous foundry industry, as defined, engaged in the business of producing miscellaneous nonferrous castings cast in sand to the order of the buyer from the buyer's designs and specifications except railroad (not street railway) car and locomotive journal bearings and castings.

(b) The term "Member of the Miscellaneous Nonferrous Sand Castings Division" means and includes, but without limitation, every individual, firm, partnership, association, corporation, or other entity engaged in business in the miscellaneous nonferrous sand castings industry as above defined.

2. Adoption of Code Submitted by Nonferrous Foundry Association for Industrial Recovery

The members of the Miscellaneous Nonferrous Sand Castings division of the nonferrous foundry industry hereby adopt and submit as a part of this supplemental code, the code submitted for the nonferrous foundry industry by the Nonferrous Foundry Association for Industrial Recovery.

3. Unfair Methods of Competition

To accomplish the purposes contemplated by this Act the members of this division of the nonferrous foundry industry agree that the following practices are unfair methods of competition in the production and/or sale of the products of the industry and subject to the penalties provided in the National Industrial Recovery act.

(a) Violation of any of the provisions of this code or amendments thereto.

(b) To give, or permit to be given, to agents or employes or representatives of customers, or agents, employes, or representatives of competitors or of prospective customers, money, or anything of value, to induce them to influence their employers, or principals, to purchase, or contract to purchase products of this industry, or to influence such employers, or principals, to refrain from contracting with competitors.

(c) Undertake to do work or furnish castings on terms other than those set forth in the contract between the parties.

(d) Withholding from, or inserting in any invoice, words or figures which make or tend to make such invoice a false record, wholly or in part, of the transaction represented or the face thereof, and of the payment or allowance of secret rebates, refunds, credits, unearned discounts, whether in the form of money or otherwise; or the extension to certain purchasers of prices, services, or privileges not extended to all purchasers under like conditions.

(e) Purchase from customers' goods, scrap, borings, and/or services at prices higher than the market for the purpose of influencing or inducing the purchase of nonferrous castings.

(f) Absorb all or any of the machining cost of castings sold as machined castings.

(g) Enter into quantity contracts with buyers without obligation on their part to take delivery of the quantities specified in the contract or on the quotation, for the purpose of giving special unwarranted prices.

(h) Accept requirements contracts without a specific minimum which shall not be less than 75 per cent of the maximum and without specifying a time limit, except where such contracts permit of a price adjustment at least once monthly to conform with metal-market advances and/or declines.

(i) To defame or disparage a competitor directly or indirectly, by words or acts, which untruthfully impugn his business integrity, his ability to keep his contracts, his credit standing, or the quality of his products; or marking, branding, labeling products and making statements regarding products, the purpose or effect of which may be misleading or tend to deceive purchasers as to the quantity quality, grade, or substance of the goods purchased.

(j) Maliciously enticing away the employes of competitors with the purpose and intent of unduly hampering, injuring, or embarrassing competitors in their business.

(k) Cancel in whole or in part or voluntarily permit the cancellation in whole or in part of any contract of sale of any product, except for a fair consideration which consideration shall include any expense incurred prior to acceptance of cancellation and any difference due to a decline in metal market prices between date of order and date cancellation is requested.

(l) Make any sale or contract of sale of any product of any description guaranteeing against a metal market decline.

(m) Make any sale or contract for sale of any castings below the seller's cost as determined by a system of cost accounting which conforms to the principles of, and is at least as detailed and complete as a uniform and standard method of cost accounting to be formulated and adopted by this division and approved by the Administrator.

(n) Guaranteeing the life or service of a nonferrous casting.

(o) Quote a flat price per pound for a variety of castings of widely varying weight and/or intricacy.

(p) Absorb the cost of patterns, pattern alterations, tools, gages, core driers, chemical analyses and/or physical tests or any special equipment in the casting price and/or charge for such equipment at less than its cost as determined as provided in paragraph (m) hereof.

(q) No provision of this supplemental code shall be so construed as to hinder the development of new uses.

SUPPLEMENT TO CODE OF NONFERROUS FOUNDRY INDUSTRY SUBMITTED BY THE ALUMINUM PERMANENT MOLD CASTINGS DIVISION OF THE NONFERROUS FOUNDRY INDUSTRY

To effectuate the policies of Title I of the National Industrial Recovery act, the following provisions are established

(*Please turn to Page* 55)

Economy Demands Two Heats Daily

Conditions in malleable industry prevent restricting operations to definite hours

By R. R. FAUNTLEROY

Moline Malleable Iron Co.

THE four broad fields of consumption of malleable iron castings are as follows: Automotive industry, railroad transportation industry, agricultural implement industry, and miscellaneous industries. Consumption of malleable castings is divided into about the following percentages: Automotive 50 per cent; railroad 18 per cent; agricultural implement 6 per cent; and miscellaneous 26 per cent.

Average annual production of malleable iron castings during the 6-year period, 1924-1929, which can be regarded as normal, according to the department of commerce statistics, was about 760,000 tons.

Sales value of malleable iron castings manufactured for sale, as shown by the census of manufacturers, for the years 1923, 1925, 1927 and 1931 is as follows: 1923, $116,673,581; 1925, $103,448,142; 1927, $86,465,065; 1929, $101,108,837; 1931, $35,294,201. As the census of manufacturers does not include production of malleable iron castings made by all companies for their own use, the total annual value of the product would be in excess of these figures.

The malleable casting industry is a capital goods industry which manufactures castings solely on orders received from its customers. It cannot manufacture in advance of such orders—hence, cannot level the peaks and valleys of operation by building up stock or inventory in anticipation of demand. These orders vary not only in one locality from another but also, in seasonal requirements, so it would be unfair to apply strictly, averages to the entire industry. Its individual units must be in a position to respond quickly to the requirements of its customers. Hours of work must be flexible and must enable the individual producer to increase his work week, for it is practically impossible for the purchaser, in the midst of a rush season, either to provide additional pattern equipment or to place existing pattern equipment with other foundries; for the nature of the work is such that a new foundry cannot at once, even though it have the men available, reach normal production.

In addition, the normal method of operation in a malleable foundry must be given consideration. The melting system used by all but a very few in the industry is the *batch melting system,* wherein a charge is put in the furnace, brought to the fluid state and then tapped. Not only, in this melting period, is the charge reduced to the fluid state for pouring, but also it is refined by burning out certain elements, such as carbon, silicon and manganese. Due to many conditions, it is not always possible to have the two results of melting come to their conclusion at the same time. Hence, the heat must be held in the furnace until both of these objects have been accomplished. This also requires a flexibility of hours.

Normal operation of a malleable plant is to take off two heats a day. Molders' floors have been laid out to store the molders' production for each heat. For the hours to be reduced to the extent that only one heat could be taken off, would mean a complete revamping of the foundry layout. There would be a marked reduction in melting efficiency with only one heat, as the second heat is melted partially by the radiated heat stored up from the first heat. Therefore, the basic process in the industry depends upon metallurgical and physical conditions that cannot be restricted uniformly to definite daily hours.

The industry has recognized its obligations to its employes during the past 3 years by spreading employment, as shown by the following statistics.

	Malleable Iron Production (Tons)	Number of Employes	Production Per Employe Per Month (Tons)
January, 1929	73,125	38,015	1.91
January, 1933	12,638	14,110	.90
August, 1933	31,811	22,320	1.42

As is shown, 38,015 were employed in the industry in January, 1929. This number was reduced in January, 1933, to 14,110. In August, 1933, there were (*Please turn to page* 50)

Cast Steel in Europe and America

With single exception of attention paid to design, steel foundry practice is alike

By PAT DWYER

FOR the benefit of readers who may not have seen the preceding articles in this series—a presentation and a defense of the technique and practices of the American steel foundry industry—it may be pertinent to refer briefly to the circumstances leading up to their presentation. Failure of a steel casting on the stern of a scout cruiser during practice maneuvers led the naval department—at least by inference—to impugn the ability of American steel founders to produce satisfactory castings. With a view of determining this point impartially a naval officer familiar with American steel foundry practice and experienced in the rigid specifications covering inspection and construction of naval vessels was commissioned to visit a large number of European steel foundries which enjoy an enviable reputation for turning out high class castings. The object of the visit was to note materials, methods, processes and general technique to the end that intelligent comparison might be drawn and improvements if any, directed to the attention of American steel founders.

In Reference To Incident

Incidentally—although the item has no direct bearing on the point at issue—and fairly typical of the manner in which the average reader secures his information and mis-information—while the newspapers and many other publications referred to the broken steel casting, none of them later—with one exception—touched upon the naval officer's mission to Europe, or, to the report which he submitted. The exception in this instance is the *Journal* of the American Society of Naval Engineers which carried Captain Shane's report in the Feb. 1933 issue followed by discussion presented by men prominent in the American steel foundry industry in the same and also in the May issues. Unfortunately, for publicity purposes, the circulation of this publication is limited.

The attitude of the *Journal* in presenting the report and subsequent discussion before the association membership is in keeping with the traditions and ethics of an exacting profession inclined at times to lean over a little backward in insistence on facts upon whch to base an opinion and on actual bed rock for a foundation on which to erect a structure. This attitude is clearly intimated in the following foreword by the *Journal* editor:

Presented To Promote Discussion

In presenting the following papers, all relating to the manufacture of steel castings, the society desires to encourage further friendly discussion of this most important problem which may lead to a better understanding between the navy and our steel industry. Such an understanding is necessary in order that the ultimate result may be the ready availability of thoroughly sound steel castings, so necessary to the building of efficient treaty naval vessels.

With relatively few exceptions, most of the castings used in naval vessels are not particularly large and, when it is realized that the weight of steel castings in modern naval construction approximates perhaps 3½ to 4 per cent of the total hull and machinery weights, it will be seen how large is the number and the variety of smaller castings used. Many of these castings are complex and in all of them, large and small, it is essential that weight be reduced to the minimum necessary for strength requirements. It is safe to say that the number of steel castings would be materially increased were it reasonably certain that sound castings could be assured.

The navy often is criticized by producers for the severity of its requirements or specifications. Often the producers are not familiar with the navy's method of purchase, which precludes the possibility of selecting its source of supply, but which by law restricts it to a system based upon competitive bidding. Often too, producers when first undertaking navy work may not fully appreciate the severe conditions under which naval machinery and equipment must reliably operate.

The navy department's program, as outlined in Captain Shane's paper, indicates that the navy does not expect the impossible, but that it does intend to know and hopes to take full advantage of the possibilities in the manufacture of steel castings. Its evident desire is to work with the steel industry of this country in mutual understanding and unanimity of purpose.

It would seem also from Captain Shane's paper that this same principle of "mutual understanding and unanimity of purpose," is applicable and actually exists within the plants of all successful steel companies. The designers, draftsmen, patternmakers and molders, all must be guided, supervised and directed, and the

work of all brought together in harmony through a co-ordinating staff whose knowledge and ability are sufficiently broad to understand thoroughly and to direct the whole process for the purpose of producing a satisfactory result.

The general attitude of the navy department is further reflected in a contribution to the general discussion by K. D. Williams, material engineer, metallurgical, bureau of engineering, navy department who pointed out in a consideration of the steel casting question it must not be forgotten that thousands of good castings are in service and many must not be condemned because of the failure of a few. In answer to the question. "Why not replace this casting with a forging?" he would venture to say that more forgings than castings have failed in service aboard our ships.

Continuing, he claimed that Captain Shane's article illustrates the futility of attempting to define what processes are necessary to produce satisfactory castings. Good castings are produced by acid and basic openhearths, electric furnaces and crucibles and although the converter process is not favored in certain districts, all foundrymen know that perfect castings have been and can be made through that medium. Without injustice, what methods should be approved and what methods condemned? Some foundries employ internal chills, others external chills and still others use no chills. Some use small risers, others large risers. Some use one kind of molding sand, others another kind of sand and still others use chamotte. Some foundries obtain fluidity by increasing the carbon content of the steel and depend on subsequent heat treatment to insure ductility. Others use lower carbon, higher pouring temperatures and obtain sufficient ductility by a simple normalizing treatment. In fact no single method or procedure insures perfect castings at all times.

Navy Wants Sound Castings

According to Mr. Williams the navy is interested in one thing only and that is obtaining good sound castings. The method which the manufacturer may elect to follow in the production of these castings is entirely, and should be entirely the one he elects. The writer of a specification which contains detailed process requirements assumes responsibility for the results obtained. Since the present inspection force is inadequate to determine that detailed process requirements are carried out, such requirements should be omitted from all specifications.

A sentiment in which all steel foundrymen heartily will concur.

Touching on the publicity which followed the failure of certain scout cruiser stern castings—publicity out of all proportion to the subject—it is to be regretted that at least a comparable volume of publicity was not accorded the action taken by the navy including the European inspection trip of Captain Shane, his report and the subsequent discussion by prominent naval men and by other men equally prominent in the steel casting industry of America.

A report may be positive or negative in character, but the deductions and conclusions drawn from one may be as illuminating as those revealed by another. By inference if not by actual statement the impression is conveyed that the navy department believed that steel foundry practice and technique in European foundries is superior to that in American steel foundries. Owing to some intangible attribute lacking in the atmosphere of this comparatively new country, American steel foundrymen could not make perfect castings.

Exchange Information Freely

Apparently no cognizance is taken of the important fact that steel founding has been practiced in America for fully as long a period as it has been practiced in Europe. Therefore the traditions, the secrets, the manual dexterity transmitted and increased from generation to generation, and the aura of infallibility incident to the manufacture of some other products, do not constitute factors of importance in the manufacture of steel castings. In recent years interchange of foundry knowledge has been common between men engaged in the industry on both sides of the Atlantic. Finally, many of the men engaged in the production of steel castings in America received their training in European foundries and in many instances still remain in touch with their former colleagues. The telegraph, the telephone, the technical press, the radio, the rapid transportation and postal service have swept away practically all the old barriers of secrecy and monopoly.

Several years ago the writer pointed out in a FOUNDRY editorial that foundrymen whose active participation in steel casting production extends back over a period of less than 30 years cannot but marvel at the manner in which methods and processes incidental to the industry have changed for the better during that time. Early experiments conducted with a view of casting a metal which hitherto always had been manipulated under the hammer or through the rolls, were fraught with trouble, danger, expense and the usual discouraging features that confront pioneers who seek to blaze a path through a new and unexplored territory. The most profound mystery enshrouded the few plants engaged in the early production of steel castings. Each foundry worked out its own salvation, slowly, painfully and with many a bump while going over the rough spots.

All the secrets appertaining to steel castings, particularly those that lie in the field of supplementary heat treatment have not yet been solved, but the steel foundryman is justified in feeling a legitimate (*Please turn to page* 48)

Questions and Answers

Covering important problems found in all phases of modern foundry practice

This department includes problems relating to metallurgical, melting and molding practice encountered in making castings. Questions addressed to the Editor of The Foundry will be answered by members of the editorial staff, supplemented where occasion requires by the following advisory staff: Steel, John Howe Hall; Malleable, H. A. Schwartz; Gray Iron, John W. Bolton; Nonferrous, N. K. B. Patch

Cores for Impellor Castings Should Be Coated

We are interested in knowing what causes brass to burn into the core of an impellor. Analysis is copper 75 per cent, tin 10 per cent, and lead 15 per cent and the metal is cast at 1800 degrees Fahr. Our sand is regular core sand bonded with linseed oil and flour using wax vents throughout the core. We coat the core with graphite. Do you know of any tools that can be used in cleaning the inside of the impellor after it has been cast?

The burning in of the metal into the cores of impellor castings is no uncommon experience, although it may be reduced materially by intelligent foundry practice.

Cores should be coated carefully with a mixture of graphite and oil. That graphite is mixed with the oil to a consistency of a heavy paste, and is rubbed on to the cores by hand. Care should be taken to see that every particle of the surface is covered and carefully applied so as not to have an excessively thick layer at any one point. After application, the cores should be warmed so as to draw off what volatiles there are in the oil, but not raised to a high enough temperature to reduce the strength of the core.

The alloy you use, having such a high content of lead gives an increase in trouble in the casting of impellors because the low melting constituent of the tin-lead series may be present in this alloy and if any little pin hole or opening is left this searching alloy will enter it. If the casting is such to demand heavy risers to be sure that no shrinkage spots occur. These risers in turn increase the hydrostatic pressure, which insures the feeding of the metal to the casting, but also insures increasing the force with which the metal is forced into the sand or core. Therefore, an alloy that does not carry quite as high a lead content sometimes is found beneficial in correcting the difficulties you are experiencing.

There is nothing we can tell you regarding tools for cleaning the inside of these impellor castings. Many shops have developed special chisels for removing of the imperfections developed from the burning-in of the metal into the core but the best method we can recommend is to be sure to make cores that will produce smooth castings and thus reduce the cost of cleaning the castings. Obviously, this is done at the cost of more expensive core work; but there is no doubt a heavy expense in connection with the production of these impellors if a high quality product is desired.

Chromium Irons Give Service in Glass Bottle Molds

We would appreciate information on the manufacture of cast iron for glass bottle molds, particularly on the following points: Chemical analysis of the metal used, whether the mold cavity is cast on a metal chill or in sand. Also, do you know of any acid process which would facilitate the polishing by hand of a sand cast patterned surface?

Old practice was to cast comparatively high silicon irons against chills, to secure a dense surface without actual chill. Such iron does fairly well but in time is subject to surface oxidation and in some cases to checking and cracking.

If a high degree of permanency is required, it is believed that some of the newer 30-35 per cent chromium cast irons will give excellent service. They are particularly free from oxidation, are fairly tough and their machinability is fair, being much better than that of regular white iron.

For molds whose service life is limited, reasonably good results can be expected from a metal of approximately 2.50-2.75 per cent silicon plus about 0.20-0.30 per cent chrome cast against chills, or 2.00 per cent silicon, 1.50 per cent nickel plus about 0.25 per cent chromium may

be used. If cast in sand lower silicon should be used, the amount depending on the thickness of the casting section. A 2.75 per cent carbon, 2.00 per cent silicon iron probably would be the best for all around combination unless alloys are to be used.

Hydrofluoric acid is the best pickling agent for removal of imbedded sand. Because of its cost it usually is mixed with a cheaper acid, say 25 per cent sulphuric acid (concentrated) plus 10 or 15 per cent hydrofluoric acid, balance water.

Supply Ample Amount of Oxygen to Melting Furnace

We are having trouble with casting metal containing 76 per cent copper, 5 per cent tin, 18 per cent lead and 1 per cent zinc as the lead sweats out and the castings are porous. As the finished casting is magnified 100 to 1 after it is finished, we melt nothing but ingot and the return gates. We have no pyrometer for testing but try to watch the temperature closely. We melt in an oil fired furnace and use Albany molding sand.

The tendency to sweat lead on castings of the alloy you describe is a common experience in the manufacture of high lead alloys. The use of a small amount of barium sulphate as a reagent on the bath during melting may be helpful to you, but it will tend to reduce your zinc content. We presume, however, that the zinc content is not important.

One and one-half to 2 pounds of barium sulphate is ample for a melt of 100 pounds, if the melting conditions are good. You should be careful to have ample oxygen supply in the combustion of your oil in your furnace, for it is the lack of oxygen that is causing your trouble and barium sulphate upon being heated, gives off by chemical reaction an additional supply of oxygen. If you will supply an ample amount of oxygen to your furnace and be sure to avoid subjecting your metal to a reducing atmosphere of any kind, you will not even need the barium sulphate.

Melt Charges with Half Steel Scrap in Small Diameter Cupola

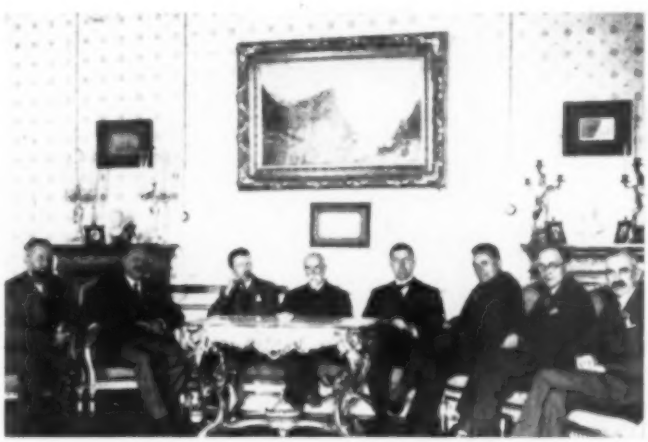
Our iron comes extremely dull when we melt a mixture of 50 per cent cast iron scrap and 50 per cent steel scrap in our 24-inch diameter cupola. The first charge is 1000 pounds of cast iron scrap followed by uniform 500-pound charges half and half cast iron and steel. We place 50 pounds of coke between the charges. After a few trips the ladles are not fit for any further use. Do you know of a good book on cupola practice?

While a preliminary charge of 1000 pounds followed by 500-pound charges separated by 50-pound coke splits may be handled satisfactorily in a 24-inch cupola, the same proportions will not yield hot iron where one half the charge is cast iron scrap and the other half is steel scrap. The reason of course is that certain classes of cast iron scrap and all steel scrap must be melted at an exceedingly high temperature, higher than the temperature required in ordinary gray iron practice. Even when melted at the highest temperature attainable in the cupola the metal retains its fluidity only for a comparatively short time and must be handled very rapidly. Addition of a small amount of ferrosilicon increases the fluidity. Without any change in the coke we suggest you cut the first iron charge down to 500 pounds and the subsequent half and half charges to 300 pounds with no individual piece weighing over 10 pounds. The many and complex factors involved in the successful operation of a cupola are set forth in *Melting Iron in the Cupola* by J. E. Hurst, which may be purchased through THE FOUNDRY.

Avoid Overheating of Permanent Molds During Pouring

We have tried iron molds for the production of bearing brasses, but they do not stand up in service. Molds vary from 1½ to 2 inches in thickness and are cast from iron of the following analysis: Silicon 1.25 per cent, sulphur 0.12 per cent, phosphorus 0.25 per cent, manganese 0.60 per cent, total carbon 3.20 per cent. The lower part of the convex face of the mold deteriorates rapidly.

Increase the thickness of metal in the molds by ½-inch. Reduce the silicon to a point between 0.85 and 0.90 per cent. Increase the total carbon to approximately 3.35 per cent and —most important of all—see that the molds are poured from real hot iron. The new molds at first should be treated with great consideration. For at least a week they should not become overheated from frequent pouring. The walls, particularly at first should be coated with a



During the foundry congress in Prague, a group of representatives were entertained by President Mazaryck of Czeochoslovakia at his summer residence. Reading from left to right: J. Leonard, H. Magdalenat, Vincent Delport, European manager of The Foundry, President Mazaryck, W. M. Geesteranus, Prof. Pisek, T. Makemson and John Cameron

paraffine base lubricating oil in which a little graphite has been mixed. The face of the mold should be cleaned with a wire brush after each pouring to remove any adhering particles of brass.

Permeability of Steel Facing Sand Varies

What is the correct permeability figure on the A.F.A. apparatus for green sand used in the production of steel castings on the bench and others on the floor up to 1000 pounds?

There is no such thing as an arbitrary figure for sand permeability. Sand deposits and sand mixtures in the steel foundry vary to an almost infinite extent. Permeability is only one of the factors and the permeability has to be adjusted to harmonize with the others, grain size, character and amount of bonding material, moisture content, density of ramming and method of preparing the sand. A permeability of 160 might work satisfactorily with certain mixtures while in others the best results would be secured with a permeability figure of 400. These two may be regarded as about the minimum and maximum. The ideal figure for any given mixture only can be determined by experiment. Generally speaking it may be regarded as an axiom that the ideal sand for green sand steel molding purposes is made up of rounded silica grains held together with a minimum amount of bond and moisture.

Polish Aluminum To Get Satin Finish

Can you give me any information on how to obtain a satin finish on aluminum castings?

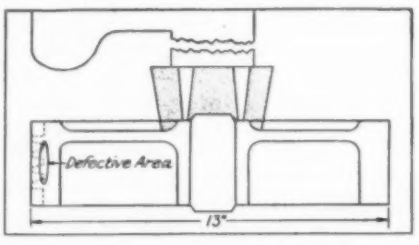
To obtain a satin finish on aluminum castings, they are polished on wheels headed with glue and abrasive, or on belt sanders, and then buffed or wire brushed. The polishing wheels may be made of disks of muslin, canvas, felt, leather or composition sewed together. Size may range from 6 to 12 inches in diameter and from 1½ to 2 inches in width. Rough polishing wheels use from No. 60 to 120 grain abrasive, and the finishing wheels from No. 140 to 180 grain depending upon the fineness of the finish. The abrasive is applied to the wheel by first coating it with glue, and then rolling it in the abrasive contained in a trough. Use a pounding action during the rolling to obtain the best results. The wheel then is allowed to dry thoroughly which will require a period from 24 to 48 hours.

The wheels are operated at from 3400 to 4400 revolutions per minute, the higher speed being for the smaller wheels. Wheels with No. 120 abrasive are used with buffing tallow, and those with No. 180 abrasive with a greaseless polishing compound. If belt sanders are used, abrasive coated belts with No. 80, 120, 140 and 180 abrasive are employed in the order given. Buffing tallow and a small quantity of machine oil are used as a lubricant.

After polishing the surface is buffed with felt or muslin wheels with grade N greaseless polishing compound which gives a fine satin finish. A still finer finish may be obtained by using a rotary fibre brush or by rubbing by hand with a paste made from pumice and oil. A wire brush satin finish is obtained after the previously mentioned buffing operation, by thoroughly removing the grease and dirt with a suitable solvent, and then brushing with a 6-inch wire brush operating at 450 to 600 revolutions per minute. The wires in the brush may range from 0.004 to 0.010-inch in diameter, and may be made from nickel, or nickel silver.

Pulley Rim Shows Dirt After Machining

I am enclosing a sketch of a small grooved pulley which is causing considerable trouble due to defects in the groved face which do not show up until the machining operation is nearly finished. I have placed risers on the side and on top of the rim, tried molds without risers, reduced the metal section by partly coring the grooves in the face, molded them with the web up and with the web down, tried changes in the analysis of the iron and tried various mixtures, but without result. Some of the castings show a graphite segregation and an oxidized condition, but in the majority of instances, the defect to me looks like a shrink. The metal is melted in an electric furnace and a typical charge is made up of: No. 1 pig iron 25 per cent; steel turnings and punchings 20 per cent; cast iron borings 10 per cent, mixed foreign and domestic scrap 45 per cent. If necessary, ferroalloys are added to secure a silicon content of approximately 2.30 per cent and manganese 0.60 per cent.



A strainer core on the hub will insure the entrance of clean iron

The trouble may be due to shrinkage induced by pouring the metal at a comparatively low temperature which prevented the risers from functioning properly. It may be traceable to some extent to a low pouring head. However, basing our opinion on experiences of a somewhat similar character we are inclined to the belief that the defective areas are due either to faulty gating methods, or faulty molding methods, or perhaps a combination of both. For some reason—lack of permeability, tight bottom board, too much water, hard ramming—the molten iron is subjected to agitation in the rim. This agitation develops a slag or slush which floats on top unless it comes into contact with the cold wall of the mold. If it touches the wall it will stick while the iron continues to rise. Naturally also, the agitation causes the metal to solidify more quickly than usual and that will account for the shrinkage cavities.

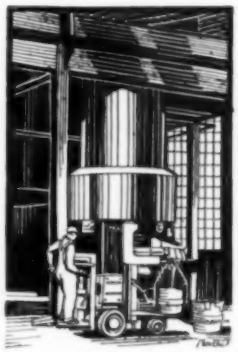
We assume that proper precaution is taken to prevent the entrance of slag or other foreign material with the iron. However, a possibility exists that the stream of iron washes sand from the sprue or gates. This foreign material landing in the rim may be halted at any point and results in a defective area only noticeable after the casting is partly machined. Pour one of the molds without a cope and watch the behavior of the iron in the rim. If it shows the slightest sign of agitation, or if any scum appears on the surface, you will have to adjust the density, dampness and permeability of the sand in succeeding molds until the metal rises clean and quiet. The best method of gating this casting is through a strainer core on the hub with six ½-inch pencil gates tapered to ¼-inch at the point where they enter the mold.

Gives Formula For Gear Blank Bronze

Can you give a good formula for gear blank bronze for use in our foundry which is operated in connection with a motion picture studio.

Undoubtedly you will find that bronze know as phosphor gear bronze, Stone's gear bronze, or English gear bronze will meet your requirements. The bronze contains from 88 to 90 per cent copper, 10 to 12 per cent tin, 0.10 to 0.30 per cent phosphorus with a maximum of 0.50 per cent of lead, zinc and other impurities. Phosphor gear bronze is a good, hard bronze for gears and worms which must meet severe requirements.

Viewing Foundry Developments



At Short Range

A PROMINENT foundry in the Middle West now is engaged in the production of a new type of automotive brake drum in which the hub or vertical member is a steel plate while the drum or ring on which the brake operates is gray cast iron. The steel plate is placed in the bottom of an ordinary green sand mold. Exceedingly hot iron entering through numerous gates comes into contact with a raised edge or rim on the perimeter of the steel plate. In the finished casting the iron and steel are held in intimate contact by fusion, by natural contraction and by key slots spaced a few inches apart all around the rim of the steel plate.

♦ ♦ ♦

In charging molten iron into an open-hearth furnace, it is often an advantage to keep out a portion of the iron until the charge is almost melted, with the object of preventing excessive foaming and loss of slag.

♦ ♦ ♦

PARAFFIN on pattern plates often results in stickiness. However, the addition of approximately 1 ounce of sweet oil to 1 quart of paraffin provides a wash which is said to be exceedingly satisfactory for pattern plates.

♦ ♦ ♦

A recently granted patent covers a process for casting iron centers in brass or bronze rim wheels for any purpose, but usually wheels in which gear teeth later are cut on a machine. The prepared bronze rim is placed in a mold containing an annular space on the outside. Molten iron is poured into this space to heat the bronze rim and to cause it to expand. Molten iron then is poured into the mold cavity proper where it comes into contact with the inner face of the bronze ring. The difference in the coefficient of expansion between the two metals causes the bronze rim to cling tightly to the cast iron center after both have cooled.

♦ ♦ ♦

Permanent molds for bronze castings in one prominent plant yield the best results when made from iron of the following composition: Total carbon 3.00 to 3.25 per cent; combined carbon not less than 0.70 per cent; silicon not over 0.80 per cent; sulphur not over 0.15 per cent; manganese from 0.55 to 0.80 per cent; phosphorus not over 0.40 per cent.

♦ ♦ ♦

HYDROGEN will attack steel at low temperatures, when under high pressures. In the first stage of the attack steel absorbs hydrogen, causing embrittlement even though no decarburization or disintegration has occurred. At this stage the steel can be restored to its original state of ductility by a suitable heat treatment to drive off the hydrogen. In the latter stages of the attack the steel becomes decarburized and fissured, with consequent severe loss in strength and ductility.

♦ ♦ ♦

Whiteheart malleable iron, with a structure of pearlite, temper carbon and a small proportion of ferrite has a thermal conductivity of 0.115 calories per square centimeter per second at 100 degrees Cent., and blackheart malleable iron, with a structure of ferrite, temper carbon and a small proportion of pearlite has a thermal conductivity of 0.150 calories per square centimeter per second at the same temperature.

♦ ♦ ♦

Increase in phosphorus produces a slight decrease in the thermal conductivity of gray cast iron.

♦ ♦ ♦

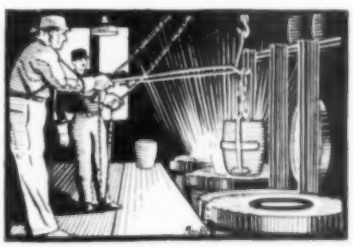
A new alloy recently developed for automobile pistons for either permanent mold or sand casting contains from 6 to 8 per cent silicon; 6 to 8 per cent nickel; 6 to 8 per cent copper and the remainder aluminum. At 900 degrees Fahr. the alloy is said to have a tensile strength of 3500 pounds per square inch while at 700 degrees the tensile strength is 12,770 pounds per square inch.

♦ ♦ ♦

BEER barrels of one piece cast aluminum, with no welds or seams, recently have been introduced. The barrel weighs approximately 70 pounds in the full size, and is tested at 125 pounds per square inch. Features include a truss construction giving strength, deep and convenient hand grips at the top and bottom, smaller dimensions resulting in more barrels per truck, no rotting, no painting, and the holding of the liquid at low temperatures. The metal is impregnated with plastic pitch, and repitching is not necessary.

♦ ♦ ♦

Experience of one user shows that bronze poured in an iron mold loses heat and fluidity much more rapidly than when poured in a sand mold. Therefore it is necessary that the molten metal posseses these two physical characteristics in a greater degree for the metal to reach all parts of the mold before it becomes



cold and sluggish and to produce a sound casting with sharp well defined contours, free from red spots, cold shuts, wrinkles, and draws under the riser and gate. Rapid solidification is a great hindrance to the release of entrapped air or gases formed in the mold or absorbed during the melting period. Failure of the mold is hastened where the metal is poured too hot. The castings will come out with honeycombed patches, caused by volatilization or oxidation of carbon particles peeled from the surface of the mold where erosion and over heating have been greatest.

European Founders Meet at Prague

By VINCENT DELPORT

PRAGUE, the old capital of Bohemia and today the capital of the Republic of Czechoslovakia, was the seat of this year's annual international foundry congress. Prof. Dr. Mont. Fr. Pisek, president, Czech foundry technical association, was the leading spirit in the organization of the congress, and he and his colleagues deserve full credit for the resulting success. Fifteen countries took part, including for the first time the Central European countries. Official delegations or representatives came from Austria, Belgium, Bulgaria, France, Germany, Great Britain, Holland, Hungary, Italy, Poland, Rumania, Spain, Sweden and the United States. The congress was under the patronage of the government, which was represented by the Minister of Public Works, J. Dostalek.

Emphasize Meeting's Importance

The congress was opened at Saturday, Sept. 9, by Mr. Dostalek, who, in his address, emphasized the importance of such international meetings, particularly in periods of crisis such as the one that is now being experienced. He mentioned that in Czechoslovakia there are three blast-furnace works, 11 steel foundries, 320 gray iron foundries, 9 malleable foundries, about 170 nonferrous foundries and 29 aluminum foundries. There are also coke ovens and refractory works, and the technical schools are well developed.

Professor Pisek, addressing the Minister, pointed out that this congress marked the tenth anniversary of the foundation of the Technical Foundry association of Czechoslovakia, and was the first international congress to be organized and conducted in a Central European country.

W. M. Geesteranus, president of the Dutch foundry association and president of the International Committee of Foundry Technical Associations, replied to the opening address on behalf of the foreign associations. He laid particular emphasis on the benefits of co-operation in science. He was followed by the Judr. Karel Baxa, mayor of Prague, who welcomed the delegates on be half of the city corporation.

A few words of greeting also were addressed to the meeting by the representatives or principal delegates of the foreign foundry associations including J. Leonard, president of the Belgian association; H. Magdalenat, president of the French association; Dr. A. Achenbach, representative of Germany; V. C. Faulkner, past-president of the Institute of British Foundrymen; Fritz Altenstein, a representative of Hungary; Guido Vanzetti, president of the group of Italian founders; K. Gierdziejiewski, president of the group of Polish founders; J. Navarro Alcacer, representative of Spain; Vincent Delport, European representative of the American Foundrymen's Association, each of whom spoke in turn.

Present Numerous Papers

Forty papers were presented at the technical session including exchange papers from the American Foundrymen's Association, the Association Technique de Fonderie de Paris, the Association Technique de Fonderie de Belgique, the Institute of British Foundrymen, the German association, the Dutch association, the Polish association, the Hungarian association, and the Spanish foundrymen.

During the congress, a works-visit tour was organized, in the course of which the delegates could see that Czechoslovakia contains some of the finest plants in Europe. The following works in or near Prague were open for visitors:

(*Concluded on Page* 58)

Dignitaries Attend

FOUNDRY leaders from the important European centers of castings manufacture were present at the recent congress at Prague. The photograph reproduced at the top of this page shows many of the official delegates seated around the speaker's table. Seated at the table in the center is J. Dostalek, minister of public works of Czechoslovakia. At his right is Prof. Pisek, president of the Czech foundry technical association and Ing. Rynda. Seated at the left of Mr. Dostalek are W. M. Geesteranus, president of the Dutch association and also president of the International committee, and T. Makemson, secretary of the Institute of British Foundrymen, honorary secretary of the International committee.

Delegates in the back row, reading from left to right, are as follows: Dr. A. Achenbach and Dr. Meyersburg, Germany; Vincent Delport, European manager of THE FOUNDRY and representative of the American Foundrymen's association; J. Navarro, Spain; G. Vanzetti, Italy; Fr. Altenstein, Hungary; K. Gierdziejiewski, Poland; an Italian and a Hungarian delegate; J. Leonard, Belgium; H. Magdalenat, France; S. Nielsson, Sweden; John Cameron, and V. C. Faulkner, Great Britain.

Definition Causes Code Discussion

Various groups attempt changes in wording at hearing on code of nonferrous industry

BEFORE a small group representing interested parties, the Nonferrous Foundry Association for Industrial Recovery on Oct. 27 offered a basic code for the branch of the foundry industry which it represents, supplemented by four group codes mainly devoted to fair practice provision to govern respectively, the sand casting division, the aluminum permanent mold division, the steel and rolling mills division and the blast furnace castings division. H. M. Halstead Jr., assistant to Deputy Administrator H. O. King, presided. Tracing the brief history of the sponsoring society, Sam Tour, executive secretary, told of the organization which had been formed following a meeting called by the American Foundrymen's association, he estimated the scope of the industry as embracing firms with a total invested capital of $24,000,000, employing 9300 men and with a production capacity of 36,000,000 pounds per month of nonferrous castings. He stated that those supporting the code at its presentation represented 60 per cent of he indusry. The definition, as noted in the code presented elsewhere in this issue covers mainly jobbing production and specifically excludes die castings, aluminum pistons, railway and locomotive brass bearings and castings.

Average Production Drops

The average production per man dropped 43½ per cent between 1929 and the first half of 1933, while the price per pound of castings also decreased 33.6 per cent in the period mentioned, according to graphs, compiled by Mr. Tour from data submitted in response to questionnaires.

James S. McClellan, lawyer, representing the Association of Manufacturers of Railway Brass, Locomotive Bearings and Castings, objected to the definition which included railway bearing brass under the Nonferrous association code. Speaking for firms that manufacture such bearings on a quantity basis, he asked to have the street railway items excluded. Mr. McClellan stated that his group hesitated to become a group under the nonferrous code by reason of difference in form of organization. The administrator suggested later conference to adjust these differences and permit the inclusion of the railway bearing group with the general basic nonferrous code.

Gilbert H. Montague, lawyer, representing the Baldwin Locomotive Works, Philadelphia, protested the definition contained in the nonferrous code and suggested a wording that would specifically except nonferrous castings made by a manufacturer of another industry or by an affiliated or parent company of such manufacture for use in the products of such other industry. He explained that the cast parts of complete machines, already excluded from the code, did not cover, but that the manufacturer should be permitted to service all machines made by his industry, by their own or competitor' firms, in competition with jobbing roundry interests, without subscribing to the code of the nonferrous foundries. The term service was inferred to mean supply repair and replacement parts.

A similar rewriting of the definition was proposed by William B. Henderson, Machinery & Allied Products institute. Briefs covering suggested changes in wage and hour provisions of the codes were submitted by James Wilson of the Patternmakers' league, Lawrence O'Keefe, president, Molders union, Mary Anderson, women's bureau, U. S. department of labor, James Prendergast, American Federation of Labor and Joseph V. Moreschi, International Hod Carriers, Building and Common Laborers union.

The Mail Order Association of America through written brief protested the inclusion of fair practice provision covering sales policies. They objected to the clause providing damages in case of contract cancellation. This provision is designed to protect foundries from causeless cancellation in time of falling metal prices and the reordering by the purchaser from other sources. The mail order group also objected to the exclusion of contracts protecting buyers from falling metal prices, which is designed to guard foundries from the necessity of heavy speculation in metals. The mail order group also asked to limit the injunction against below cost selling by providing that advertising, credits, loss of accounts, warehousing and distribution costs should not apply in its members relations with nonferrous foundries.

Administration advisers on the hearing were the following: Labor, Charles W. Wilkerson; industry, H. M. Holt, Bohn Aluminum & Brass Corp., Detroit, and Dan M. Avey, THE FOUNDRY, Cleveland; consumers, H. A. Vaughn; research and planning, Arthur Notman; and legal, W. B. C. Pilcher.

The supplemental group codes were presented by the following manufacturers in the industry concerned: Blast furnace castings by Harwood Smeeth, Smeeth Harwood Co., Chicago; aluminum permanent mold castings, E. G. Fahlman, Permold Co., Cleveland; steel and rolling mill castings, H. A. White, National Bearing Metals Corp., Pittsburgh. Sam Tour presented the sand castings division supplemental code.

Approves Idea Of Founding Course

Sir Rober Hadfield recently presented the University of Sheffield with a gift of £5000, in commemoration of the visit of the Iron & Steel institute to Sheffield in 1905, when he was president, and the recent meeting of the organization in that city.

While he has left the application and distribution of the money to the university, Sir Robert has expressed approval of the recent proposal of Dr. J. H. Andrews, professor of metallurgy at Sheffield, to establish a founding course in the faculty of metallurgy of the university, and has indicated that perhaps the fund might form the nucleus for that special purpose. The course would carry a degree in metallurgy (founding).

Men of Industry

Whose Activities Are Making Foundry History

WILLIAM J. CORBETT recently was made works manager of the Atlas Steel Casting Co., Buffalo. Mr. Corbett has had an interesting career in the steel casting industry. He was graduated from Carnegie Institute of Technology, Pittsburgh, in 1914, with a degree of bachelor of science in mining engineering, and a few years later obtained the professional degree of metallurgical engineer. Immediately following graduation, he became a special apprentice at the Alliance, O. works of the American Steel Foundries, and a year later he was transferred to the Chester, Pa. works of that company as production engineer. From 1917 to 1919 he served as officer in the ordnance department, U. S. Army, being stationed at the Watertown arsenal as assistant superintendent in charge of the manufacture of castings. In 1919 he again became connected with the American Steel Foundries as assistant to the fourth vice president with headquarters in Chicago.

William J. Corbett

In 1923 he became industrial engineer and assistant director of the Electric Steel Founders Research group and 2 years later was made secretary-manager of the Steel Founders Society of America. During his connection with that organization he served on various committees of the American Society for Testing Materials, the American Foundrymen's association, and was a member of the joint committee for investigation of the effect of phosphorus and sulphur in steel, the joint committee on foundry refractories, the joint committee on pattern equipment standardization, and the joint committee on molding sand research. He became works manager and assistant to the president of the Fort Pitt Steel Casting Co., in 1929, and resigned that connection in 1932.

♦ ♦ ♦

W. K. LEACH, formerly with General Alloys Co., Boston, has become associated with the American Manganese Steel Co., as general manager of the alloy division. Mr. Leach is located at the St. Louis plant of that company, which produces chromium-nickel castings for high temperature and corrosion applications.

♦ ♦ ♦

GEORGE B. INGERSOLL, who retired recently as assistant general manager of the Beloit, Wis. works of Fairbanks, Morse & Co., after an association of 32 years, has been elected city manager of Beloit. Mr. Ingersoll was born in Beloit in 1867, was graduated from Beloit college in 1889 and from the University of Wisconsin in 1893. He has been active in municipal affairs for many years.

♦ ♦ ♦

ARNOLD LENZ, assistant manufacturing manager, Chevrolet Motor Co., Flint, Mich., has been awarded the honorary degre of Doctor of Engineering by the University of Aachen, Aachen, Germany, for his contributions to the development of the foundry industry in general and particularly for his work in the production of high grade automotive castings. The formal papers for this honorary degree were presented by Dr. Fritz W. Meyer, foundry consultant and metallurgist. The University of Aachen is headed by Professor Dr. Paul Roentgen and the recently dedicated Foundry institute of that institution is headed by Professor Dr. E. Piwowarsky.

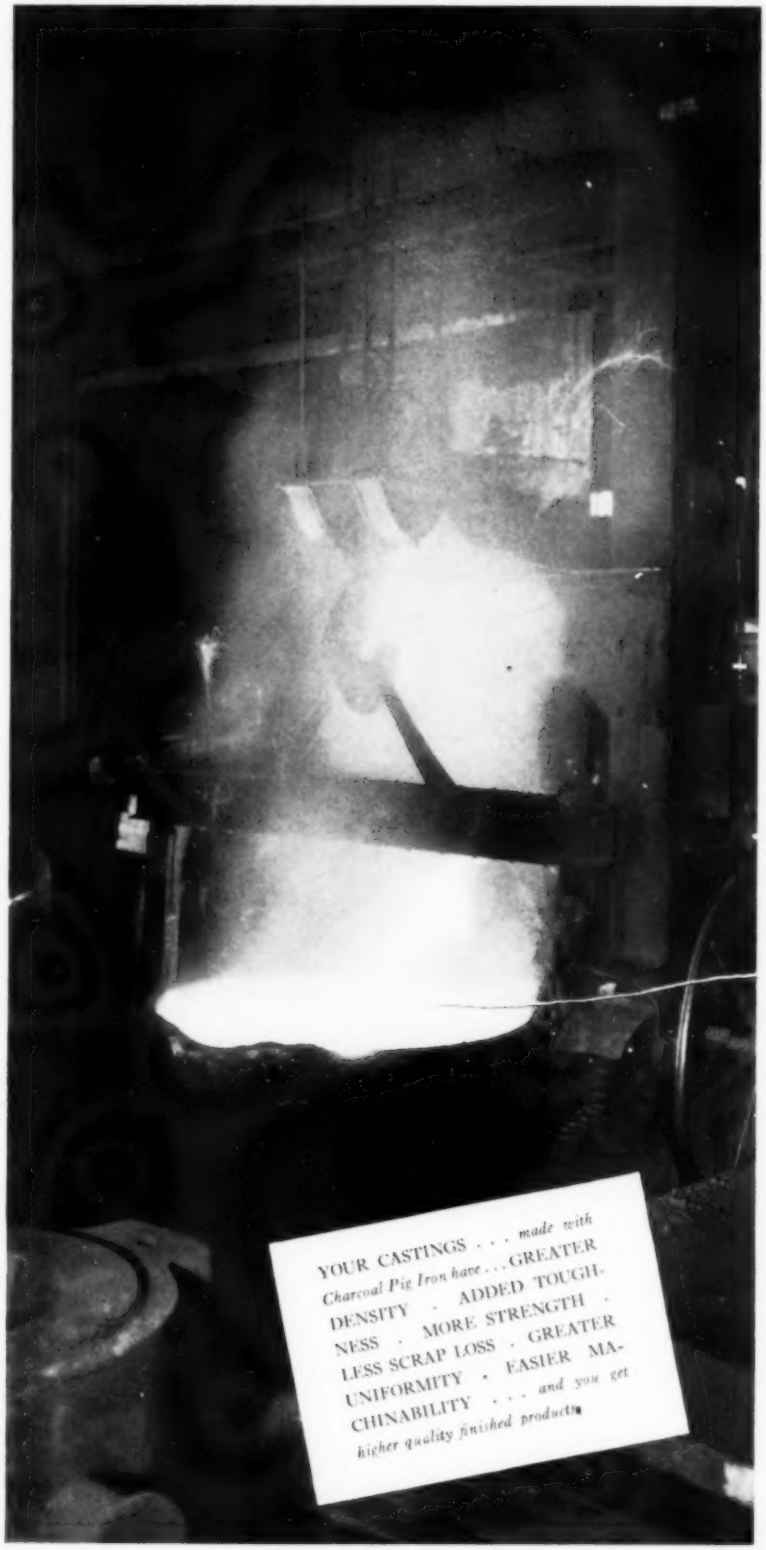
Mr. Lenz was born May 10, 1888 at Hauingen, Germany, and came to the United States when 14 years of age. He attended New York State Normal school for two terms and in 1908 accepted his first position with the Browning Foundry Co., Ravenna, O. Since that time he has served in various capacities with the Alliance Brass & Bronze Co., Alliance, O., Ryder Brass Foundry Co., Bucyrus, O., American Clay Machinery Co., Bucyrus, O., and the American Range & Foundry Co., Cleveland. In May, 1916, he became connected with the Buick Motor Co., Flint, where he rose to assistant foundry superintendent in the same year.

Arnold Lenz

He accepted a position as assistant to the manager of the Aluminum Casting Co., Detroit, January, 1919, but returned to General Motors Corp. the following May as superintendent of the gray iron foundry of the Saginaw Products Co., Saginaw, then under construction. In 1922 he became manager of that plant and in June, 1925, he was promoted to assistant to the general manager of the Saginaw Products Co. in charge of gray iron and malleable iron foundries. In 1927 the

(*Concluded on page* 32)

To the Foundryman who wants to produce


YOUR CASTINGS . . . made with Charcoal Pig Iron have . . . GREATER DENSITY . ADDED TOUGHNESS . MORE STRENGTH . LESS SCRAP LOSS . GREATER UNIFORMITY . EASIER MACHINABILITY . . . and you get higher quality finished products

QUALITY CASTINGS

There is no surer way of building up and retaining customer satisfaction than supplying your customers with consistently fine castings . . . castings that are dependable, durable, and satisfactory in every way. In a word, *quality* castings.

You will find that 15% to 20% Superior Charcoal Pig Iron in the mix will do a great deal toward insuring the production of consistently fine castings. For castings made with Superior Charcoal Pig Iron are tougher, denser, more uniform, easier to machine. They are more durable . . . and are far less likely to prove defective. And, equally important, they help your customers to turn out a higher quality finished product.

Then, too, you will save money, in the long run, by using a percentage of Superior Charcoal Pig Iron in the mix . . . because you will have fewer rejections and greatly reduced scrap loss.

Superior Charcoal Pig Iron has made no concessions to hard times. There has been no substitution of scrap, scale, or cinders for pure iron ore in Superior Charcoal Iron Furnaces. Superior Charcoal Iron is still the purest pig iron made.

Use at least 15% to 20% Superior Charcoal Iron in making castings. Then you'll turn out quality castings, definitely insured against defects. You'll have satisfied customers. You'll attract new business and you'll increase foundry profits.

SUPERIOR CHARCOAL IRON COMPANY
Grand Rapids, Mich.
Debevoise-Anderson Co., Inc.,
Eastern Representative
New York . Boston . Philadelphia

Superior Charcoal Pig Iron

(*Concluded from page* 30)

gray iron foundry was taken over by Chevrolet and he became, as manager of that plant, a part of the Chevrolet organization. In 1932 he was made assistant manufacturing manager of that company.

Mr. Lenz has taken an active interest in association work and is a past director of the American Foundrymen's association.

STUART DEAN, president, Dean Bros. Co., Indianapolis, pump manufacturer, was elected second vice president of the Indianapolis Rotary club at the annual election recently.

H. B. PARKER, vice president and general manager, Albion Malleable Iron Co., Albion, Mich., has donated a site to the city of Albion for the erection of a $50,000 city hall building.

LLOYD JONES, formerly manager of the Salem, O., works of E. W. Bliss Co., Brooklyn, N. Y., has resigned to become vice president of the Continental Roll & Steel Foundry Co. with headquarters in Pittsburgh.

MALCOLM C. KNEELAND, formerly assistant manager, Lincoln plant, United Engineering & Foundry Co., Pittsburgh, has become connected with the Pittsburgh Steel Foundry Corp., Glassport, Pa., as manager of iron roll production. He was with the United company at its Lincoln plant, Pittsburgh, from 1913 to 1931, when the plant was consolidated with the company's Canton, O. works.

JULIUS B. GREENSTREET, Textile Machine Works, Reading, Pa., addressed the Philadelphia chapter of the American Society for Steel Treating at the Engineers club, 1317 Spruce street, Friday evening, Oct. 27 on "Cast Iron."

JOHN A. FRY, vice president and general manager, Detroit-Michigan Stove Co., Detroit, has been elected chairman of the manufacturers' section, American Gas association, New York.

DR. COLIN G. FINK, professor of electrochemistry at Columbia university, New York, has been elected to receive the Perkin medal of the Society of Chemical Industry for 1934 in recognition of his valuable work in applied chemistry.

G. M. HERMAN has resigned as western sales representative of the United Engineering & Foundry Co., Pittsburgh, to become vice president in charge of sales of the Hubbard Steel Foundry division of the Continental Roll & Steel Foundry Co., East Chicago, Ind.

Propose Changes To Iron Soil Pipe Code

Provision for watchman, apprentices, shipping crews and superannuated employes was omitted from the Cast Iron Soil Pipe code approved by the President Sept. 7. To remedy the omission the Code Authority on Oct. 23 proposed several amendments to that code at a public hearing conducted by Deputy Administrator H. O. King.

The code provides a 27-hour minimum work week, but under the changes proposed, watchman would be restricted to 56 hours a week or seven 8-hour days, and shipping crews to 40 hours a week or five 8-hour days. Superannuated employes and apprentices might each be employed up to 5 per cent of the number of employes in any plant at 80 per cent of the code's minimum rates of 32 cents an hour in the South and 40 cents in the North, under the changes suggested.

Book Review

Business Under the Recovery Act, by Lawrence Valenstein and E. B. Weiss, cloth, 314 pages 5 x 7½ inches, published by Whittlesey House, McGraw-Hill Book Co., New York, and supplied by THE FOUNDRY, Cleveland, for $2.50 plus 15 cents postage and in Europe by the Penton Publishing Co., Ltd., Caxton House, Westminster, London.

The aim of this book is to present the manufacturing executive and others with a picture of the changes which are being brought about in merchandising, selling and advertising activities under the new order of things established by the administration of the National Industrial Recovery act. The authors believe that the most important thought to be imbedded in the minds of business men is the fact that under the new regime there will be a need for more intensive selling, not less. In the field of advertising, they believe that the business of advertising has every thing to gain and practically nothing to lose by this new experiment.

Scrapping Plants

An interesting bulletin entitled "Why the Scrapping of Obsolete Plants Is Patriotic, Economical and Profitable" recently has been published by the Austin Co., Cleveland. The publication discusses the economical factors resulting from construction work, points to some of the projects under way, and shows that through construction the movement of capital goods may be accelerated and industrial recovery speeded.

Reader's Comment

EDITOR'S NOTE — *Material Appearing Under this Head Does Not Necessarily Reflect the Opinion of* THE FOUNDRY *or of Its Editors.*

For Investigation

TO THE EDITORS:

We understand that malleable foundries in Ohio come under the classification Manual 3086 and now take a rating of $1.15 per $100 a payroll whereas they formerly took a rating of 70 cents. On making inquiry of our actuaries we are advised that the classification experience for this Manual is as follows:

Classification	
Experience	1/1/28
Manual 3086	to 1/1/33
Payroll	$20,297,576
Earned Premium	173,063
Incurred Losses	248,332
Incurred Deficit	75,269

You will see that the above experience developed over the past 5 years, apparently justifying the Commission in imposing the increase on the malleable industry.

It occurs to me that this might be a subject for investigation, article or comment in one of your publications. At any rate it is of interest to note that the payroll under the malleable classification shows over $20,000,000 for the State of Ohio during a 5-year period.

A READER.

'Tis Paid

TO THE EDITORS:

Your statement of the 1st received and the quoted line attracts attention, so in addition to the check renewing our subscription we just add three more lines.

"Oh, it's small, they're in no hurry,
Will never prove a business aid,
Things alive we should not bury,
So here's the check, the bill is paid."

CHARLES F. HOPKINS,
Alliance Brass & Bronze Co.
Alliance, O.

* * *

"Haste makes waste is an adage old,
Discounted by the young, they say
But you and I need not be told,
We honor most those prompt to pay."

THE EDITORS.

ON THE JOB!

CHAIN BELT COMPANY

REX CHAIN - REX CONCRETE MIXERS
REX SPROCKETS - REX TRAVELING WATER SCREENS
REX ELEVATORS AND REX CONVEYORS

MILWAUKEE, WIS. October 28, 1932

Mr. Verne E. Minich
American Foundry Equipment Co.
Mishawaka, Ind.

Dear Mr. Minich.

In answer to your letter of October 24th, we have had the Wheelabrator Tum-Blast in operation now for a period of seven weeks and have now put the machine into full production.

The installation of the electrically operated loading skip has practically doubled the capacity of the Tum-Blast machine, as compared to our previous method of hand loading. We are now operating on cleaning hard iron castings, and the machine is handling our present tonnage very nicely, allowing us to shut down all of our hard iron tumbling mills.

In addition to eliminating a bad source of dust by the shutting down of older equipment mentioned above, we have found that the new machine does a better cleaning job than we were previously able to do. The machine has come up to our expectations, both as to the type of job that it does on cleaning, and to the production we have obtained from it.

Very truly yours,

G.K. Viall

Vice President

G.K.Viall/h

■ *The photograph, letter and illustration of castings need no explanation. It is a complete story of one of a number of Airless WHEELABRATOR installations — the machine, the statement of performance from the user, and the work being cleaned.* ■

...Airless

WHEELABRATOR

TUM-BLAST

The Airless WHEELABRATOR reaches the goal set by foundrymen for cleaning room equipment. It cleans castings faster and better without the use of one pound of costly compressed air. All the unique features of this equipment combined produce low cost production heretofore considered impossible. ■ The WHEELABRATOR not only replaces and obsoletes sand and shot blasting but in the majority of applications the cost of cleaning is lower than that of tumbling. ■ No user of cleaning equipment can afford to neglect investigating the American Airless WHEELABRATOR. Complete details will be gladly sent, or upon request a representative will call without obligation.

THE AMERICAN FOUNDRY EQUIPMENT CO.

Mishawaka, Indiana

Prevent Losses with

Proper Gates and Risers

By PAT DWYER

COPPER bearing aluminum alloys present difficulties in molding due to the relatively high crystallization shrinkage and hot shortness. Desired physical properties of these alloys are developed later by suitable heat treatment. Special methods or precautions must be employed in the manufacture of these castings to prevent rupture and other forms of defects in the stages preceding the heat treatment. Gates must be considered in relation to many factors.

Navy Department specifications for aluminum alloy, light, castings, 46 Ala, class 4, show the following composition: Aluminum 94.5 per cent minimum, copper 4.0-5.0 per cent, silicon 1.20 maximum, zinc 0.25 per cent maximum, iron 1.20 per cent maximum, manganese 0.35 per cent maximum, manganese trace maximum. In a number of specimens tested at the naval gun factory, Washington the silicon ranged from 0.13 to 0.21 per cent and the iron content from 0.16 to 0.19 per cent. The tensile strength and elongation were unusually high, in one instance showing a tensile strength of 37,500 pounds per square inch and an elongation of 17.2 per cent in 2 inches.

Present Uniform Cross Section

The following description of the methods pursued in the production of heat treated aluminum-copper alloy castings is abstracted from a paper by Lewis H. Fawcett, metallurgist naval gun factory, Washington, before a convention of the American Foundrymens association in Chicago, May 4-7, 1931, and published in THE FOUNDRY Aug. 1, 1931.

Within practical limitations castings should be designed to present as nearly as possible a uniform cross section in thickness. Abrupt changes should be avoided between sections of various thickness. Outside corners should be rounded and inner corners filleted. Round openings are preferable to those with square corners. In many instances patterns entirely satisfactory for silicon aluminum alloys are not suitable for the heat treated alloy. Wherever practical, patterns should be designed to leave their own cores. Heavy sections should be accessible for the necessary feeding heads. Loose pieces on the pattern requiring excessive reinforcement in overhanging bodies of sand should be avoided. Accurate patterns, substantial molding equipment and close fitting cores are required to prevent the formation of fins which may interfere with the contraction of the casting.

General principles underlying the molding of aluminum alloy castings apply in the main to the heat treated metal, but special precautions are required in many of the details. In green sand practice the venting is important. The sand should be rammed lightly and uniformly, also the sand should contain slightly less moisture than is customary in molds for other nonferrous metals. Where bars are required in the cope, they should be spaced further than usual apart to facilitate setting the feeders to the best advantage and to prevent opposition to contraction. In many instances, brackets and tie bars must be provided to prevent the casting from cracking. Chills—internal, external or both—are absolutely essential in heavy sections beyond the influence of a shrink head.

Cores should be soft and crushable to facilitate the contraction of the casting through the hot-short temperature range. By suitable construction and composition, the cores for these castings may be made just sufficiently strong to withstand careful handling and—later—the pressure of the molten metal. Factors which influence suitability of the cores include a binder which disintegrates at comparatively low temperature, hollow centers, or centers filled with crushed coke or cinders, minimum number of rods or other reinforcement.

Gates Designed Properly

Unless the gate is designed and place properly it may interfere with normal contraction and cause the metal in the casting to crack. With comparatively few exceptions—and this rule applies to all metals—gates should be designed to deliver metal first to the smaller rather than the thicker sections of the casting. In this manner the metal is cooled to some extent before it reaches the heavier section and the result is a more uniform grain size throughout the casting. Under ideal conditions the in-flowing metal from the gate meets no obstruction. Barriers to the stream set up a commotion in the metal with consequent erosion of the mold or core face. Gas bubbles and slushy material develop and float to the top or are caught against the side walls of the mold. The probability of securing a clean casting increases with the distance the metal flows from the gate before meeting an obstruction.

Occasionally an increase in the pouring temperature of the metal may be required to pour an exceptionally thin casting, or a casting with greatly extended area, but before this is done a careful study should be made with a view of devel-

(*Continued on page* 37)

Gated On Top

MANY precautions must be observed in the production of heat treated aluminum alloy castings presenting hot short characteristics and a tendency toward distortion in the as cast condition. Gates and risers should be arranged in a manner to allow free contraction of the casting. In this and in other examples cited for illustration, attention is directed to the fact that gravity is an important factor in the distribution of the molten metal in the mold and in the ensuing contraction and shrinkage phenomena. On large flat surfaces a number of pencil gates supplied with metal from a suitable central source will produce more satisfactory castings than branch gates at the sides from which the metal is forced to travel a long distance at high speed and temperature. If necessary number of gates should be increased in preference to raising temperature of the metal.

ADVERTISING PAGES REMOVED

(*Continued from page 34*)

oping a gating system that will serve with metal of normal pouring temperature. For example the metal might be introduced at two or more points and thus shorten the distance it has to travel, instead of forcing all the metal through one entrance and then depending on the extra fluidity induced by high temperature to carry the metal through a thin section or to far away points in the mold.

More liberal use of shrink heads is necessary with this alloy than with the aluminum-silicon alloy. A shrink head circular in cross section referred to previously on more than one occasion and in connection with other metals—is the most efficient shape. With this particular alloy an increase in the height of the head in many instances produces better results than increase in the diameter, provided of course that the original diameter is of reasonable dimension. Manifestly no increase in height would serve any useful purpose if the metal solidified before the metal in the casting.

As pointed out in a previous article (THE FOUNDRY, Sept., 1933), a high pouring head is not recommended. The pressure effect from a high shrink head may be secured by filling the head with hot metal after the sprue or pouring basin has been covered with sand held in place by an iron plate or other suitable weight. Care should be taken to prevent the metal from over flowing either in the sprue or the head. Fins produced in this manner may interfere with contraction and cause the casting to crack.

Control of pouring temperature should be maintained accurately. Low temperature decreases contraction during solidification and also increases the mechanical properties of the material. A general rule that may be followed safely is to pour the metal at the lowest possible temperature that will run the casting. Before pouring, the metal should be fluxed with zinc chloride (1 ounce per 100 pounds of metal) and skimmed carefully. Sprues should be kept choked during pouring and the metal handled quietly without agitation to prevent oxidation and to keep the castings free from dross. The ideal condition is attained by pouring the metal in an unbroken stream from a low height.

Strip the Castings

Usually it is desirable and in many instances imperative, to shake out intricate castings and remove the cores as soon as the castings can be handled, to facilitate contraction. Great care is required to prevent distortion, but the results usually compensate for the extra care and trouble required. An addditional hazard always is present in the hot-short characteristic of the metal. After the casting has cooled the heads and gates are removed with a saw. The stumps, if any, are ground to the level of the surrounding surface. Fins also are removed by grinding. After these operations the castings are ready for heat treatment.

The housing frame casting shown in Fig. 217 illustrates several of the peculiar characteristics involved in the production of heat treated aluminum alloy castings. The pattern was of plain box construction. The mold was made in green sand. The interior and the openings through the walls were formed by dry sand cores. No. O Albany sand was used for facing material. Moisture in the facing and backing sand was held under 5 per cent. After the mold was finished the face was sprayed with crude oil to protect the chills and eliminate the necessity of moistening with water any areas of sand that might have dried out through exposure to the air. Forty-eight cast iron chills were distributed over the bottom face in the drag and four narrow copper chills were set adjacent to the three most prominent core prints.

The casting was gated at both ends at the joint between the cope and drag. *A* is the sprue, *B* is the runner formed in the cope face and *C* is the gate, two wide shallow channels cut in the drag. The arrangement is an adaptation of the self skimmer type gate by which any dust or dross in the first metal is carried in the runner to a point beyond the gate entrance. Clean metal from the bottom of the runner flows through the gates into the mold. Entering the mold at the highest point, rapid distribution of the metal is assisted by the law of gravity.

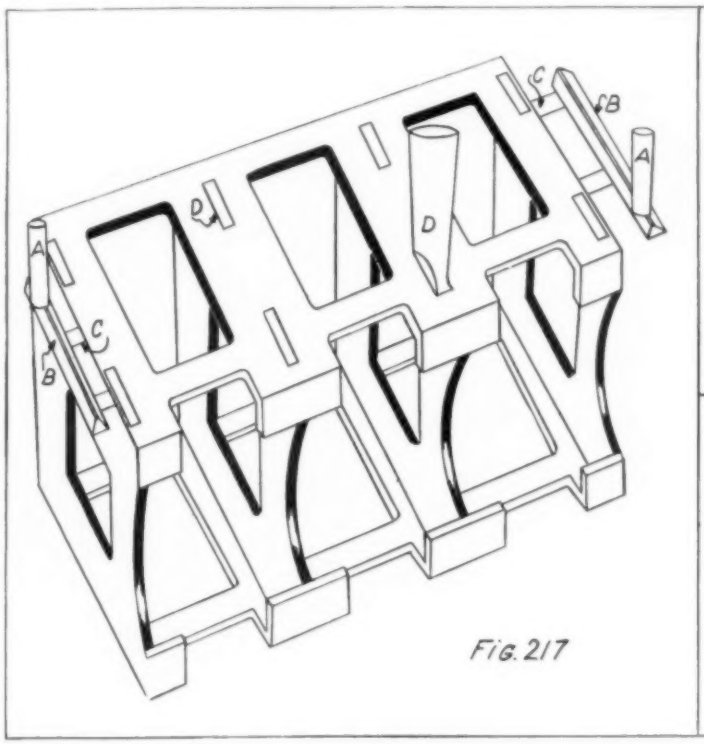


Fig. 217

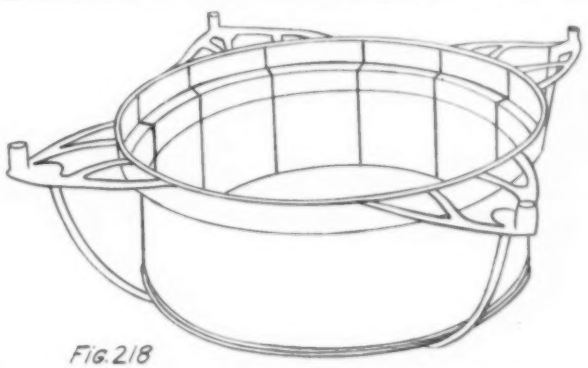


Fig. 218

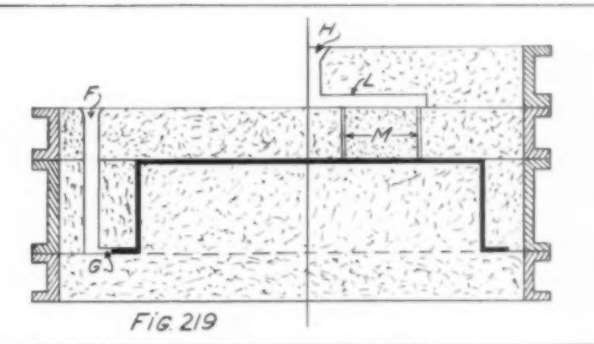


Fig. 219

Fig. 217 (Left)—This housing casting was poured through gates C at both ends and fed through eight risers D, one of which is shown in full. Fig. 218 (Upper right)—Showing method of gating an aluminum ring 6 feet in diameter. Fig. 219 (Lower right)—At the left the casting is shown gated at the bottom. At the right an extra cope is employed and the casting is gated through pencil gates on the top

Location of the eight shrink heads or feeders is indicated at *D*. One feeder is shown in full to illustrate the shape, circular in cross section down to a point a few inches above the face of the casting where it is flared to a comparatively narrow rectangle.

The three comparatively fragile cores which formed the inside of the casting were made from a mixture containing 120 parts silica sand and 1 part oil by volume, tempered with water and blended thoroughly in a mechanical paddle mixer. The dried cores were painted with blacking while still sufficiently hot to dry the blacking, and then were placed in the mold.

The casting approximately 1 x 2 x 3 feet was poured simultaneously at both ends from two crucibles, each containing about 75 pounds of metal. Immediately after the metal solidified the sand was removed from around the sprues and shrink heads to facilitate contraction of the casting.

Method of gating a large ordinary or No. 12 aluminum casting to facilitate rapid distribution of the metal is illustrated in Fig. 218. This casting was 6 feet in diameter, 30 inches high with a metal thickness of ¾-inch. Perhaps the most peculiar feature about this casting, particularly peculiar to men who insist on placing risers on all castings, is the entire absence of risers of any kind in this instance. The casting is uniform in cross sectional thickness therefore the shrinkage is uniform and is not accentuated at any one point more than at another. Also it will be noted that the wall of the casting is vertical, a position in which shrinkage and gravity work together. This feature has been covered in a previous discussion dealing with pipe, ingot molds and other gray iron castings molded and poured in a vertical position.

The outside face of the casting shown in Fig. 218 was formed in a skin dried mold, while the interior face was formed by a set of dry sand segment cores assembled in a suitable print provided by the pattern. These cores were made from a maximum amount of old sand and a minimum amount of binder and consequently crushed readily while the casting was contracting. Sand in the center of the mold hastily was dug away and four cores at diametrically opposite points were removed after the casting had set, thus facilitating contraction of the casting.

In addition to rapid and uniform distribution of metal secured by the gate arrangement shown, approximately uniform temperature was insured by pouring metal of identical temperature simultaneously from four ladles. The first streams gently entered the mold at the bottom through four long horn gates. Increased volume of metal then filled the mold rapidly through the horn gates and through the four branch gates leading to each of the four sprues at the upper joint level of the mold.

The casting shown in section in Fig. 219 is typical of many aluminum castings which bring grief to the foundryman when gated in the usual manner indicated in the left half of the illustration. This particular casting is 3 x 3 feet, 15 inches deep and the metal wall is 5/16-inch thick. In some instances the molder will cut a large number of shallow branch gates attached to a long runner at the bottom. In other instances he will cut similar gates at the top, that is between the cope and drag. Occasionally he may try a combination of both bottom and top gates. The principal objection to any of the three methods cited is the necessity of pouring exceedingly hot metal to prevent cold shuts on the large flat surface. This metal is too hot for the vertical walls.

A preferable method of gating this type of casting is shown to the right in Fig. 219. The method involves a little more work on each mold, but it eliminates a great deal of the hazard. An extra cope is required, but the total amount of sand required is about the same for either method, since with all the gates on top, a much smaller flask may be employed for making the mold.

In this particular instance—a 3-foot square casting—a total of 16 pencil gates is arranged in the cope in four rows of four gates each over the face of the casting. In this manner the mold is fed by 16 streams of fresh liquid metal which flows down the sides at slightly reduced temperature and remains hottest on top where comparatively high temperature is required to prevent cold shuts. One central sprue *H* conveys the metal to a long horizontal runner which in turn fills the transverse runners *L* Fig. 219. Four of these runners in turn deliver the metal to the 16 pencil gates *M*.

This is the forty-sixth of a series of articles dealing with the various types of gates and risers used in the foundry industry. The forty-seventh installment will appear in an early issue.—THE EDITORS.

Talks on X-Rays

The first regular meeting of the 1933-1934 season of the Pittsburgh Foundrymen's association was held Oct. 16, at Carnegie Institute of Technology. Dinner was served at the Carnegie inn. After dinner, the regular monthly meeting was held in room 104 in the college of industries, Carnegie Institute of Technology.

Robert F. Mehl, director of the metals research laboratory, Carnegie Institute of Technology, Pittsburgh, spoke on "Detecting Defects in Castings by Means of X-rays and Gamma-rays."

Safety Council Makes Annual Awards

First prize in the gray iron foundry division was awarded to the Mackintosh-Hemphill Co., Pittsburgh at the recent meeting of the National Safety council in Chicago. Second and third prizes in that division were won by the Coshocton, O., and the Newcomerstown, O., plants of James B. Clow & Sons. In the steel division, the Haynes-Stellite Co., Kokomo, Ind., was awarded first place, the Midland, Pa. plant of the Mackintosh-Hemphill Co. second and the Central works, American Rolling Mill Co., Middletown, O., third.

In the Metals section, E. F. Blank, Joens & Laughlin Steel Corp., Pittsburgh, was elected general chairman, J. A. Voss, Republic Steel Corp., Youngstown, O., and H. W. Darr, Bethlehem Steel Co., Bethlehem, Pa., vice chairmen, and A. Berquist, Youngstown Sheet & Tube Co., Youngstown, O., secretary and newsletter editor. F. G. Bennett, Buckeye Steel Castings Co., Columbus, O., is chairman of the foundry committee.

New Jersey Group Holds First Meeting

Arthur M. Torrey, secretary of the Employers' Association of New Jersey, addressed the regular meeting of the New Jersey Foundrymen's association held at Newark, N. J., on Oct. 25. He outlined certain of the more important provisions of the recovery act bearing on employer-employe relationships.

Walter H. Cole, president, Moore Bros. Foundry Co., Elizabeth, N. J., announced the public hearing for the code of fair practice of the gray iron industry. Fifty-two members attended the meeting.

Discusses Effect Of NIRA on Industry

Affects of N. I. R. A. on the foundry industry were discussed Oct. 11 evening at the first Fall meeting of the Philadelphia Foundrymen's Association Inc. by Richard M. Neustadt, director of the Pennsylvania state employment commission, at the Manufacturers and Bankers club. Major Fred C. Henke, industrial engineer, associated with the Palmyra Foundry Co., Palmyra, N. J., also made some observations on the recovery act.

E. T. Frohman, vice president, S. Obermayer Co., Pittsburgh, has been elected president of the alumni of Rose Polytechnic Institute, Terre Haute, Ind.

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Toronto Works
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4815

Molding Condenser Castings

(*Continued from page* 15)

top the upper flange sections were doweled in place and sand tucked under and around them. The remainder of the ramming was completed, a parting made and the cope with upper joint auxiliary gate and riser pins in position, was rammed and removed.

Eight guide stakes intended to insure the correct withdrawal and replacement of the cheek part of the mold, were driven in the floor, two at each corner of the lifting plate. The tops projected about 2 inches above the upper face of the pattern as shown in Fig. 3.

Before removing the cheek, the top of the body core was softened up and a couple of inches depth of sand removed. A thickness of facing sand was spread over the whole area and lightly tamped to a degree of density that would prevent the casting from swelling, and yet soft enough to prevent the surface from scabbing.

Use Vent Wire

A long wire was employed to vent the entire upper area and to carry the vent holes down to the coke bed. This is a highly important operation, too often sadly neglected in hollow green sand molding. The tops of the vent holes were finger plugged and a last thin layer of facing sand lightly pressed on with the fingers before the strickle or sweep was employed to form the mold for the end plate.

The outer joint was brushed clean. A row of vent holes was pierced under the upper flange pattern from the flask edge almost to the vertical wall of the pattern. The loose flange sections were swabbed and drawn out. The dowel pins were drawn inward through the inside lagging some time previously.

Before the cheek was hoisted, a block of wood was passed around and hammered on top of the inside lagging reinforcement to jar the pattern slightly and thus contribute to a better lift. The cheek was lifted by four chains equipped with turnbuckles. The turnbuckles were manipulated to lift the load slowly and uniformly for about 2 inches. The crane hoist then lifted the cheek clear of the pattern. Minor repairs along the lower edge readily were effected after the cheek had been blocked up to a suitable height on the floor.

After the sand surrounding the strengthening ribs and small hub was nailed and filleted, these loose parts were drawn in. The face of the cheek was finished and well coated with plumbago facing. The outlet core forming the opening in the small hub was secured in its print with ⅛-inch clearance left at the end to avoid a crush when finally closing the mold.

Lifting the pattern and finishing the drag—the lower flange and the body core—presented no unusual features. Inlet gates were cut into the lower flange as shown in the illustration of the finished mold, Fig. 3. The auxiliary gates on the upper joint provided for the rapid flooding of the upper part of the body by metal from a bull or shank ladle.

The space around the top rim of the body core left by the stiffening or lagging strips was filled with sand packed behind a straight making up board held against the parallel faces and a short segment, the same contour as the pattern held at each end. The fillet along the top edge of the main core was formed at the same time and nailed for increased safety in the area near the auxiliary gates.

The circular cake cores 1½ inches thick, intended to form the 30-inch and 22-inch openings in the end plate were set in place flat on the top face of the body core and secured by a few spikes driven through the center holes. This was an extra precaution to prevent them from moving before the rush of the metal.

The customer showed the size and location of the holes on the blueprint, but did not provide any coreboxes. Each flat circular core was swept up on a core plate. A ⅝-inch hole drilled near the center of the plate served as a center and socket for a 9/16-inch hardwood dowel pin projecting from the lower edge of the sweep board near one end. This sweep board or strickle was cut out for the larger core. An adjustable loose piece was screwed in the gap when sweeping up the smaller size core. Details of the equipment, also the type of light cast iron arbor or grid are shown in plan and cross section in Fig. 5. The cores were made from a strong oil sand mixture. One pair of core irons carefully salvaged from each casting, served for the full order.

The flat face cope was finished easily. A few gaggers rammed below the face were tapped back. The entire surface was examined for soft spots and corrected, then trued up with a short straightedge, slicked and plumbago coated in the usual manner. Chain and turnbuckle arrangement again was employed in replacing the cheek on the drag. The small core projecting from the end introduced a hazard that called for slow and careful guidance down of the cheek. A thin ring of flour spread around the top of each opening core showed that the cope rested on them lightly, thus preventing the formation of a fin and consequent breaking of the light core grids. After final closing the runner and riser heads were built up. Four weights of the design shown in Fig. 6 were placed over the assembled mold. The ends were supported on packing blocks built up from the floor and the weights cleared the upper edge of the cope by 1-inch. Wedges were driven between the weights and flask along each side, thus assuring 4 tons static pressure on the mold without any danger of crushing.

Each of the four weights 8 feet 9 inches long, 9 inches square was provided with two steel loops for lifting and with a 3-inch diameter hole near each end. Thus they were available either for weights or binder bars. Their initial cost was low through the use of a simple frame pattern, open on top and bottom, with two cross bars nailed inside to prevent the sides from yielding. A hard bed was struck off on parallel strips leveled about 11 inches below the floor. Slab or cake cores were laid end to end on this bed. The pattern was placed on the cores and green sand was rammed around the sides and ends up to the floor level. A sprue and inlet gate just above the cores were arranged at one end.

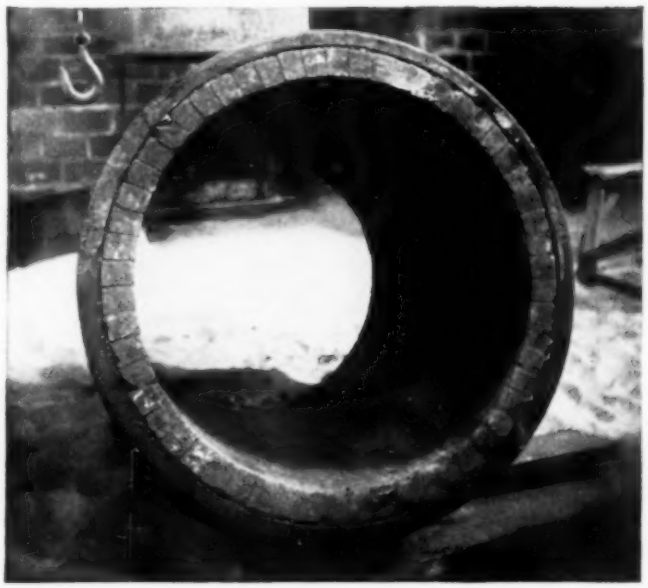
Pound from Scrap Mixture

Dry sand bottom cores while not absolutely essential, guaranteed a straight bottom face on the weights, besides securing better results from the partially skilled labor employed to make the molds. Once rammed up and the pattern drawn out of the sand, little remained but to clean the loose sand out of the mold and to set and secure the steel loops before pouring the 2100 pounds of iron. On account of the heavy section a low grade scrap iron charge in the cupola was considered satisfactory for these castings.

The 2200-pound lifting plate was poured from a 15 per cent semi-steel mixture with a fairly high silicon, high manganese, low phosphorus and low sulphur content. The plate provided close grained material with a higher than scrap value when it was broken up after the tanks had been tested and installed. Ordinary foundry iron was used for the flask parts.

Molding the center or open end sections presented no special features. They were much simpler to handle than the end castings. Although the total molding and coremaking time was about 8 hours less, the cost of producing one section was about the same as that of another. This was due to the difference in weight, 1600 pounds compared to 2500 pounds.

SIXTY HEATS AS AGAINST TWO



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HERE are two photographs that tell an important story—that emphasize the importance of the proper selection of refractories.

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Note the condition of the "Carbofrax" Brick—little or no erosion—negative spalling and cracking—the lining still good for further operation.

On the right a shell lined with fire clay brick after *two heats.* In some places the brick has eroded and melted down to the shell—the lining has practically disappeared.

Both linings used in a special reduction process under exactly the same conditions.

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Ohio Brass Co. Keeps Plant Clean

(*Continued from page* 12)

boards, clamps, weights, etc., and everything must be kept in its proper place. In the malleable department, a special building has been built adjacent to the foundry proper, and in the brass shop, one end of the building and a balcony are used for that purpose. Special bins are provided for wedges and clamps.

The molder is allowed to have only the equipment necessary to mold the particular pattern assigned to him. Whenever he is given a matchplate which requires a different size of flask and bottom board than the one he has been using, it is necessary that all of the flasks and bottom boards which will not be in use on that job be returned to the storage department before flasks and bottom boards of proper size for the new plate can be secured. The foreman in the brass shop is responsible for seeing that such materials are returned, while in the malleable foundry an assistant foreman, who also acts as an instructor, sees that the necessary equipment is kept in place.

Responsibility for movement of patterns in the foundry is established definitely, as a matter of protection and good housekeeping. The foundry foreman must secure all patterns from the pattern storage vault and give them to the molder. This procedure is followed to provide an absolute check on the equipment before it is placed in the sand.

Check Kept on Patterns

Often patterns going to the molder have not been in use for some time. During the period of inactivity, it may have been found advisable and expedient to designate certain changes or repairs which should be made. Experience with castings previously made from that pattern also may have indicated the need for more or less attention. The necessary information is sent to the pattern storage immediately after the decision is made for any type of change, and is placed on a tag which is attached to the pattern. Therefore, by having the foreman get the pattern, such notations as have been made will receive proper attention and an unsuitable pattern will not be used. The molder must return the pattern to the pattern storage before he is given a new job. Incidentally, the company has fireproof pattern storage vaults of large capacity for both of its foundries.

While the organizational and educational campaigns of the Ohio Brass Co. have been successful and exceedingly valuable in providing a means for furthering the plant housekeeping program, they represent only one phase of the activity. Throughout the plant, the company has expended a large sum of money over a period of years in installing equipment that will collect dirt at its source and carry it away from the building. At every point where dust, acid fumes, steam or other by-products of the manufacturing processes might endanger the health or efficiency of the employe, equipment has been installed to offer the needed protection.

An example of the type of installation employed is shown in Fig. 2 in connection with a battery of four sandblast machines. The majority of blast units employed in the plant are of the rotating barrel type with a roll cover which is pulled down over the front of the machine when in operation. Each machine is equipped with a ventilating pipe leading to the main exhaust pipe to the dust arrester. Batteries of these machines are located in various parts of the plant, including both the brass and malleable shops, the galvanizing plant and the annealing department.

All of the dust arresters for the sandblast machines are located on the outside of the building and the air, after being cleaned, is discharged to the atmosphere. All of the arresters are equipped with automatic shakedown equipment and are rapped daily. The units are cleaned twice a week and all refuse and dust is removed. Once a week the equipment is inspected to see that the bags are in good order and the units are functioning properly.

The grinding departments are well equipped with ventilating equipment. Grinding machines in both foundries operated by the company are provided with guards and ventilating hoods which enclose the wheels for approximately three quarters of the circumference. Each guard is equipped with an exhaust pipe leading to the main exhaust duct for the room. Separation of dirt and air is accomplished by a cyclone type arrester. As shown in Fig. 3, the grinding departments are exceptionally clean and free from dirt. In addition to the protection described, grinding machine operators in the soft iron department are provided with, and are required to wear respirators.

Suction fans exhaust acid fumes and steam from the galvanizing, pickling, and plating departments, tinning baths, driers, and at all other places where the manufacturing process results in the production of such fumes. The gases and steam are carried through stacks to the atmosphere in such a manner as to leave no trace of the fumes at any point in the vicinity of the buildings. In this connection, it is interesting to note that the atmosphere inside of the pickling and galvanizing departments is practically free from any trace of acid fumes or smoke. In the galvanizing department, special exhaust pipes are provided to carry away the steam from the tanks holding the water used to wash the material after it is taken from the galvanizing tanks.

In the pattern shop, wood planers, saws and other power tools which will produce sawdust and chips, are equipped with guards and exhaust pipes leading to cyclone arresters. A pedestal type sanding machine is provided with a suction arrester of the vacuum cleaner type. As a matter of safety, the machines in the wood shop are well guarded.

An interesting application of the exhaust fan is found in the physical testing laboratory. A ro-tap type sand testing machine and a small coal pulverizing unit for making up samples are located under a hood, as is shown in Fig. 6. An exhaust fan carries away any dust or dirt which may be produced in operating either of these machines. Four hoods in the chemical laboratory are provided with an ample exhaust system to carry away all of the fumes which may be liberated. A ventilator also is installed over a small laboratory induction furnace.

Inspect Them Regularly

An extensive installation of ventilating equipment may be of little value unless care is exercised to see that it is working properly. The inspection procedure for the dust arresters has been mentioned. Ventilating blowers or fans likewise are inspected periodically, at present once a month but during times of peak operation they are checked oftener. Tests are made to determine the speed of the blower and also the pressure in the exhaust pipes.

Air furnaces, annealing furnaces and boilers of the plant are fired with powdered coal. A special building about three stories high has been built at the far end of the plant property to house the pulverizing and handling equipment for the coal. The inflammable character of the fine coal provides an extra incentive for good housekeeping in that department. Special runways have been built throughout the interior of the building so that it is possible for workmen to reach every section of the wall, the structural steel work and the equipment with the nozzle of an industrial vacuum cleaner. About twice a week the workmen go over the entire building interior so that no coal dust or other dirt is allowed to accumulate. A special dust recovery system operated in connection with the pulverizing equipment now recovers 300 tons of pulverized coal

(*Concluded on page* 45)

ADVERTISING PAGES REMOVED

(*Concluded from Page 42*)

a year that at first was discharged into the atmosphere.

The power plant, where steam is produced for different processing operations throughout the plant, and for heating, represents another interesting example of good housekeeping, for the interior is spotless and has more the appearance of an office building than a boiler room. One man handles the entire operation of the plant. The desire of the management to provide for any emergencies which may arise also is well illustrated in the power house. Every piece of equipment there is installed in pairs, so that in case of a breakdown of any piece of equipment in the building, the power plant can continue to produce steam. Each of the two boilers is equipped to be fired with either powdered coal or oil and the change from one to the other type of fuel may be made in five minutes. A small generator has sufficient capacity for the operation of the powdered coal pulverizing and handling department, in case of failure of the public utility source of power.

Safety equipment, in reality a necessary adjunct to any good housekeeping program, is supplied and required for certain operations. All men handling metal, as well as weight shifters, must wear goggles and safety leggings. Responsibility for the men wearing the safety equipment rests with the furnace tender, and no workman is permitted to get metal from the furnace until he is wearing the proper equipment.

Maintains Dispensary

The company maintains a well equipped dispensary and first aid station in charge of a trained nurse. A local medical doctor spends two hours a day at the plant, and frequently will see from 60 to 80 patients during that time. Before being employed, each person must have a physical examination, either by the company doctor or the family physician. Information is gathered on vision, hearing, heart, chest, abdomen, limbs, blood pressure and urine. Periodic examinations are required of all employes.

All factory employes are given a physical examination once a year. Workmen in the sandblast department are examined every six weeks, with special attention being paid to the condition of the lungs, temperature and weight. If the man develops a cough, a temperature or loses weight, he is transferred at once to another department of the plant. Sandblast operators are not allowed to stay on that job continuously for more than one year, but are transferred to other departments of the plant. They may be returned to the sandblast department after spending from 6 months to a year at other work.

All accidents of a minor nature which happen during the day are given first aid treatment by the nurse and the workman is required to come back to the dispensary for an examination when the doctor is in the plant. Colds and other minor illnesses which do not keep the workman off the job, are given treatment in the dispensary. If the workman has a temperature of 100 degrees, or otherwise is considered sick enough to be sent home, he is provided with transportation, either in the company's service car or a taxi, and is instructed to call his family doctor. The company nurse makes a follow up call the next day to ascertain if he has had the proper medical attention.

In case of an accident of a serious nature which will cause a loss of time, the employe is first asked his choice of doctor. If he elects to have the company doctor, the expense for treatment is handled through the industrial commission in the same manner as in the case of any other physician. This policy of not requiring the services of the company doctor in the case of accidents of a more serious nature is appreciated by the workmen and has helped greatly to produce complete harmony between the management, the medical department and the men.

The company also has provided three locker and wash rooms for the convenience of the male employes in the brass and the malleable foundries and the female workers in the core room. An exceedingly pleasant room in the building housing the laboratories and the plant offices is available for the workmen carrying their lunch.

Such a program as has been in operation at the Ohio Brass Co. plants pays dividends in many ways. Employes find the clean and healthful surroundings conducive to greater effort. Cost of production is reduced, serious accidents are decreased almost to the vanishing point, and employer-employe relationships are splendid. Figures show the improvement in safety. In 1928 the company had 268 lost time accidents in its entire plant. The following year, through educational work and efforts in housekeeping, that number was cut to 20, and thus far in 1933, only three lost time accidents have occurred. At the time the plant in Mansfield was visited to secure data for this article, the brass foundry had operated 1743 days without a lost time accident, and the malleable foundry had extended its record to 696 days.

Harry C. Brown formerly vice president, has been made president of the Newhall Chain Forge & Iron Co., New York.

Sales Engineer Assigned to New England

George G. Adam, sales engineer, molding machine division, Osborn Mfg. Co., Cleveland, has been assigned to the eastern territory, which includes the New England states and the Eastern seaboard. With the exception of a brief period recently when he was connected with the company's experimental department he has been sales engineer for Ohio and a part of Michigan since 1925.

Mr. Adam attended Shaw high school, Cleveland, and completed night courses at both the Cleveland Y. M. C. A. and East Technical high school. From 1916 to 1919 he was employed in the engineering department of the Grant Motor Car Co., Cleveland. He then was employed in the engineering department of the Accurate Machine Co. and later the Tool & Auto Products Co. In September 1920 he became connected with the Osborn Mfg. Co., working in the engineering department as draftsman until January 1921, when he undertook a ten months' foundry training course at the Grafton Foundry Co., Grafton, O. He then returned to the Osborn company, where he was engaged in engineering and layout work until he was promoted to sales engineer in the molding machine division.

Quad City Meeting Features Housekeeping

R. D. Holland, Hill & Griffith Co., Cincinnati, spoke on "Silicosis and Its Prevention in Industry" and C. V. Greenwood, International Harvester Co., Rock Island, talked on "Safety and Good Housekeeping in the Modern Manufacturing Plant" at the regular meeting of the Quad-City Foundrymen's association held Oct. 23 at the LeClaire hotel, Moline, Ill. Harry F. Henninger, International Harvester Co., Rock Island, and president of the association, presided.

A. D. Matheson, chairman of the membership committee made the following appointments, representing towns in the district, to serve on his committee: Davenport-Bettendorf, Robert Eichman, Bettendorf Co.; Moline, Clyde Burgston, Deere & Co.; East Moline, F. O. Gorman, John Deere Spreader Works; Rock Island, Herman Alexis, U. S. Arsenal.

The next meeting will be held Nov. 20 at the Fort Armstrong hotel, Rock Island, and will be devoted to a discussion of "Malleable Cast Iron."

Gives Properties Of Welded Cast Steel

Interesting information relative to the welding of steel castings was brought out in a paper by Charles H. Jennings, research laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., on "Physical Properties of Welded Cast Steel," which was presented at the meeting of the American Welding Society in Detroit on Oct. 3.

Results of the investigation on which the paper was based show that cast steel of the composition investigated, which analyzed 0.28 per cent carbon, 0.86 per cent manganese and 0.47 per cent silicon, can be arc welded successfully to cast steel or hot-rolled, low-carbon steel by bare and fluxed electrodes. Welding on cast surfaces is not harmful and results are approximately equal to those obtained from welds made on machined surfaces. The average tensile properties obtained from welds made on various combinations of cast and hot rolled, low carbon steel were as follows: With fillet welds, using bare electrodes, 64,300 pounds per square inch and with fluxed electrodes, 75,000 pounds per square inch. With butt welds, bare electrodes, the strength was 63,000 pounds per square inch and with fluxed electrodes 73,600 pounds.

Maj. R. A. Bull, Chicago, discussing Mr. Jennings' paper, made several comments of particular interest to steel foundrymen. He declared that the good results obtained by Mr. Jennings in testing welds on cast steel containing 0.28 per cent carbon, 0.86 per cent manganese, and 0.47 per cent silicon discount claims made recently by some welding engineers that the economical fusion fabrication of steel requires a carbon content not much over 0.20 per cent and a maximum silicon content of about 0.30 per cent. Foundrymen have learned from experience that carbon cast steel having a composition similar to that in Mr. Jennings' material, and customarily used for most industrial purposes, may be readily and effectively welded. Casting makers will be gratified at the results of the tests reported, bearing indirectly but very significantly on the matter of preferred composition.

Major Bull also stated that many steel foundrymen now are particularly interested in data showing what can be expected when welding each of many varieties of alloy cast steels for fabrication with alloy wrought steel parts, and for the deposition of alloyed metal to eliminate small surface blemishes on castings of special steels. In treating these for the sake of appearance, the conscientious foundryman prefers that the new metal have characteristics as nearly as possible like those in the parent material. Since much remains to be done in ascertaining the weld potentialities of many special grades of foundry steel, their producers will appreciate active co-operation of welding experts for that purpose.

New Sales Engineer Has Worked in Russia

Elmer A. Blake has been made sales engineer, molding machine division, Osborn Mfg. Co., Cleveland, for Ohio and the southern states. Mr. Blake has had an interesting and varied experience in foundry work. He served his apprenticeship at the Ideal Pattern Works, Cleveland, and then was employed as patternmaker by several Cleveland com-

Elmer A. Blake

panies. From 1922 to 1925 he was assistant foreman, Motor Patterns Co., Cleveland, and during the following 2 years was in charge of the pattern shop at the West Steel Castings Co., Cleveland. In 1927 he became foreman of the Wurster Pattern Co., Cleveland.

Mr. Blake became connected with the Osborn company in 1929 to supervise the design and layout of pattern equipment for the Leningrad Tractor plant in Russia. After that work was completed, he supervised the testing of all pattern equipment for the Stalingrad Tractor plant in Russia. From May, 1930, to January, 1931, he was in Russia at the Stalingrad plant.

He then returned to Cleveland to test molding machine equipment for the Kharkov Tractor plant and later went to Russia again to supervise the erection of that equipment. Since returning to this country in December, 1931, he has had charge of the experimental department of the Osborn company.

Foundries Do Their Part

(*Concluded from page* 13)

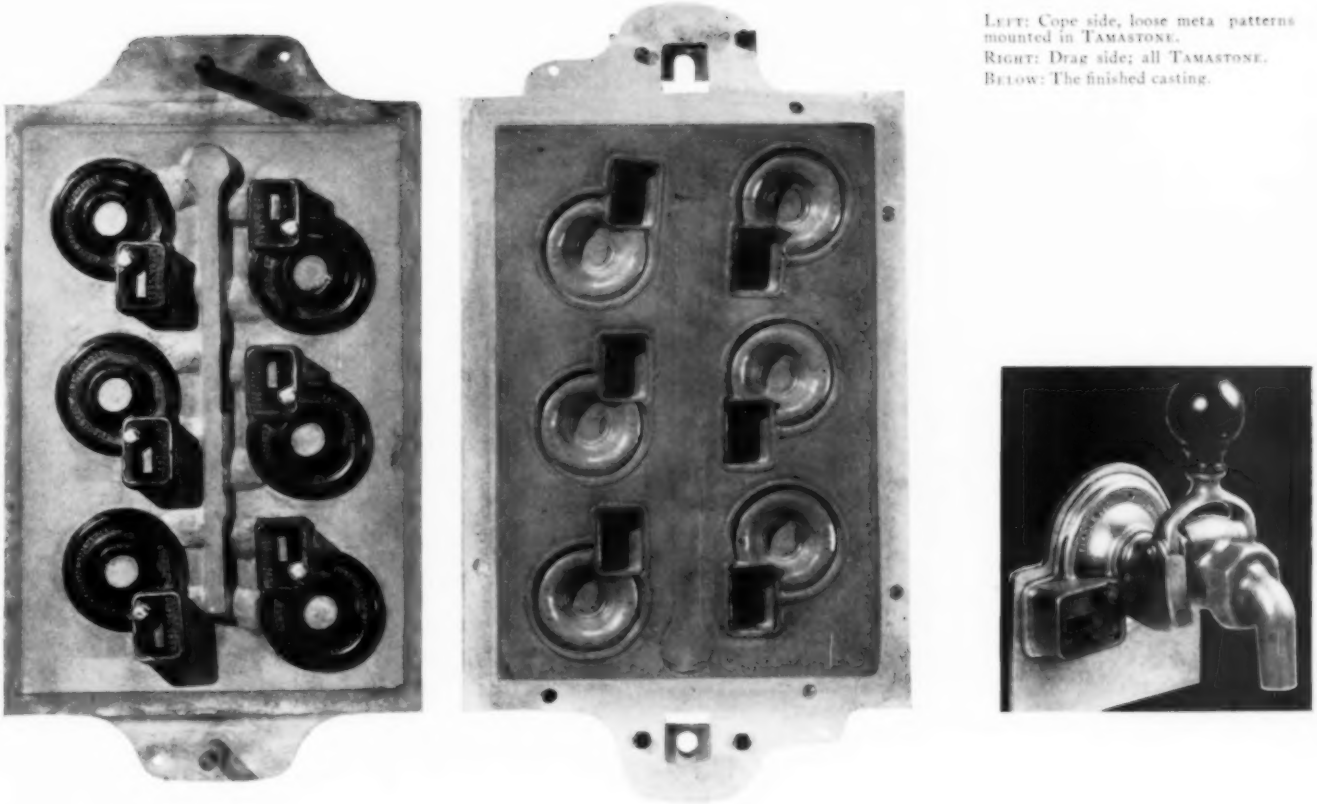
appeal and the punitive power of the act specifically conferred upon the NRA assures compliance.

The foundry industry as a whole is divided into groups and organizations which must appreciate the broad phases of questions which will arise. The four main branches of the industry represent most largely the jobbing foundry business, although in the case of all four codes a certain amount of specialty work has sought and obtained affiliation with one of the four foundry trade associations. In addition, all of the larger machinery interests operating under product codes and which embrace firms that employ subsidiary or departmental foundries, will be under product codes.

Smaller groups of specialty manufacturers also have taken the route of product classification. Among these are the special tool, die and machine shop group; cast iron boiler and cast iron radiator group, warm air furnace manufacturing industry; cast iron pressure pipe industry; automotive parts equipment group, etc. If the administration boards of all of these diverse codes is imbued at the outset with an idea of inter-relation and can take the broad view rather than assert selfish interests, this organization plan will prove effective. Fortunately, the majority of executives in all of these groups and branches see the benefit of adjusting conflicts and differences by mutual negotiation.

The mere approval and application of a code does not mark the completion of effort on the part of the industries or the associations which represent them. A code is not a static instrument. Rather, it represents a set of rules or laws capable of frequent change in form, content and application. This is demonstrated by the case of the cast iron soil pipe industry code, one of the first filed and effective Sept. 11. This already has been amended following a public hearing Oct. 23. Consequently, the burden of responsibility upon directing officers and code authorities by no means is relieved. Their job is likely to be even more complicated as the scheme of regimentation brings forward new conditions and new problems.

American Gas association, 420 Lexington avenue, New York, has published a booklet entitled "Watson House—An English Research Center" by C. A. Masterman, chief tecnical officer, Gas Light & Coke Co., London.



LEFT: Cope side, loose meta patterns mounted in TAMASTONE.
RIGHT: Drag side; all TAMASTONE.
BELOW: The finished casting.

The Castings *Buyer* Insists on TAMASTONE

When a manufacturer specifies TAMASTONE patterns, he must have a good reason. When E. R. Pierce, President of Pierce Leonard Appliances, Chicago, ordered castings for a beer meter, he knew what he wanted. Formerly a foundry superintendent, production engineer and pattern foreman, Mr. Pierce says:

"TAMASTONE gives us better match plates for our beer meter castings, at lower cost, and superior castings that help sell our finished product. I wish I could have found a pattern compound half as good as TAMASTONE when I was in the foundry."

Both cope and drag for these castings were molded in TAMASTONE—drag side all stone, cope side stone and loose metal patterns. By mounting loose patterns in this way, the foundry can develop additional profits through lower molding costs.

Total equipment required: 25 lbs. TAMASTONE, 6 loose metal patterns. Use of the Tamms master frame added no cost to this job, since the frame is interchangeable with any job. Total labor, both halves: 1 hour 15 minutes, including molding, cleaning, etc. Total cost, all labor and materials: *Less than $4.00.* Compare this cost with any other pattern method giving equal results.

There is nothing "tricky" about using TAMASTONE, no guess work in results. Every pattern is perfect, costs less and gives as many molds per day as high-priced equipment. TAMASTONE pours freely and reproduces finest details exactly. It sets in one hour, with *no shrinkage* and practically no finishing labor. No wonder TAMASTONE has had phenomenal acceptance wherever molding and pattern costs are all-important without sacrifice of finished quality.

Write for Cost-Saving Demonstration

TAMMS SILICA COMPANY

FOUNDRY DIVISION

228 North La Salle St. **Chicago, Illinois**

Cast Steel in Europe and America

(*Continued from page* 23)

pride in the reflection that he has traveled farther on the road to perfection and in a shorter time than foundrymen engaged in the production of castings in any other metal. Steel castings produced in the United States in 1898 amounted to approximately 147,769 tons. In 1905 this had increased to 500,000 tons. By 1920 the production had increased to 1,000,000 tons and this amount was almost doubled in 1929—the greatest up to the present—when the production is given as 1,773,005 tons. Out of this total 70.95 per cent was produced by the open hearth process, 27.64 per cent by the electric process, 1.35 per cent in the converter and 0.06 per cent by the crucible method.

All of which would seem to bear out the contention that the expansion of the steel casting industry in the United States within the memory of living man presents the most outstanding example of metallurgical, mechanical and commercial progress in the history of this or any preceding century. Basing an opinion merely on the steady increase in production—100 per cent in the latest 10 year period—it seems reasonable to assume that the steel castings made in American foundries have given satisfactory service.

Practice Is Similar

The foregoing also applies to the steel foundry industry in Europe where progress has followed along parallel lines. To claim that the practice in one country is markedly superior to that in another is contrary to the knowledge of all who are competent to express an opinion on the subject.

Skill and experience gained through a long period of manipulation and actual contact enable the foundrymen to predicate in advance the approximate degree of perfection in any given casting, but certain variable factors over which he has absolutely no control prevent any foundry at any time from furnishing a positive guarantee that the casting from any given mold will be perfect. Out of every hundred duplicate castings produced under apparently exactly similar conditions, one or more will be defective.

This casuality feature is so well recognized by all practical foundrymen as part of the usual routine that it has been incorporated in a shop axiom: "The foundry that never made a bad casting, never made a good one."

Strange as it may seem this is almost the only feature which cannot be explained to a layman, or—and he usually is the more resistant of the two—a young scientific or technical man with no practical knowledge or experience. The average layman is not particularly interested in the subject. You may be right, he says in effect, or you may be wrong. Have it your own way. He has troubles enough of his own.

The pure scientist or the technical man without experience, irrespective of whether he is just a downy fledgeling fresh from the nest of old Alma Mater or a veteran of the library, takes the militant view, a view invariably derogatory to the reputation and attainments of the man in the shop. He has no patience with the man in the shop who cannot promise positively in advance that a casting will be perfect when it is shaken out of the mold.

He loses sight entirely—since he never has conducted the experiment himself—of the important fact that every casting is the result of an experiment. Each casting is a new and shining object never before in existence. Irrespective of the care exercised in assembling the mold and melting the metal the final test is not applied until the metal enters the mold where it is changed from the liquid to the solid form and where it is subjected to an irresistible natural law which reduces the volume approximately 1/36th or 2.8 per cent.

Human care, human skill, precision and accuracy may be cultivated to a high degree, but absolute perfection and infallibility have not been attained up to the present in the steel casting field or in any other field.

In many instances the shop man is not familiar with the reasons which influence a designing engineer in the shape of a casting. The designing engineer is not familiar with the technique of producing the casting. Consultation between the two readily may lead to a compromise in which the changed design in no manner will affect the function of the casting, but will facilitate the work of the foundryman and remove certain hazards from the sum total of hazards which threaten the production of any casting.

This point already has been covered in R. A. Bull's contribution (THE FOUNDRY, October 1933) in which he agrees with a statement of C. W. Briggs that the steel foundry needs technically trained men who know a great deal about theory. He disagrees most emphatically with the dictum that we need men "who know a great deal more about theory and less about the mechanical application of molding." He emphasizes his conception that the "mechanical application of molding" involves a great deal, and consistently may include casting design. Much more than mere craftsmanship is involved. That must exist, plus understanding of and adaptation to the phenomena that occur throughout the filling of the mold and the progressive solidification of the casting. Facts important to acquire for the successful supervision of such work can be obtained only by the application of theory to extended practice on the molding floor. Metallurgy, mechanical engineering and craftsmanship are connected inseparably in the routine task of running a jobbing steel foundry.

Should Maintain List

Touching on a second inhibitory factor which in some instances forms the base of criticism of the American steel casting industry Mr. Bull points out that the navy never can reasonably expect to obtain an invariable supply of thoroughly satisfactory steel castings unless some procedure is set up permitting consideration of proposals in other respects than in price alone. It is unfortunate that the government does not have available a procedure similar to that employed by many large transportation and industrial corporations. A separately maintained approved list of suppliers to which potentially acceptable bids are restricted.

George Batty (THE FOUNDRY, Sept. 1933) incisively touches upon several angles of the same situation. His personal experience has shown that the foreman or superintendent is burdened with a cost limitation in the production of keenly cut price castings. To hold his job he is forced to cut corners and cut quality. This is rank unfairness to the practical man and to this unfairness is added the indictment that he is incompetent and necessarily must be supported and buttressed by technicians and scientists to produce even passable castings. Further, some steel founders deplore what they consider the costive and frigid mentality of certain users of steel castings in that these users insist upon certain physical properties which do not appear justifiable when the actual service conditions of the component are considered.

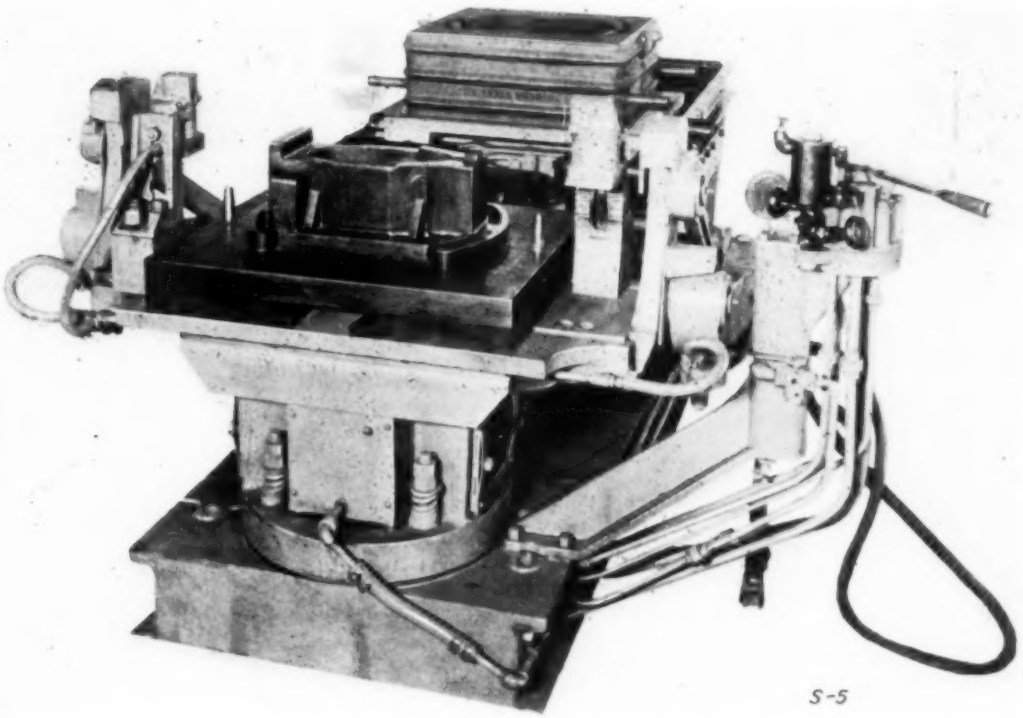
As pointed out by P. E. McKinney (THE FOUNDRY, Oct. 1933) Captain Shane's review of his inspection trip to various European steel foundries discloses no fundamental features of physical equipment, or any facilities possessed by foreign plants that are not available in the United States. Taking the industry as a whole in this country, it is probably more modern and up to date than it is in Europe where tradition, custom and conservatism are regarded more seriously than they are in America.

These same factors, custom, tradition and conservatism serve an extremely useful purpose in one respect

(*Concluded on page* 50)

IF IT'S A HERMAN IT'S WORTH USING. IT MADE ITS WAY BY THE WAY IT'S MADE

HERMAN MOLDING MACHINES



S-5

Herman 750 lb. Capacity Jarr-Rollover Accuracy

Customers are insisting on accurately made castings. Their machining costs must be cut and kept at a minimum. The new HERMAN Jarr-Rollovers welcome such work. They produce true-to-pattern molds, and will continue to do so for years.

Our designing engineers know the service to which molding machines are necessarily subjected in all classes of foundries. HERMAN machines are not fabricated, they are built of castings. Their rugged construction assure years of satisfactory service.

Bulletin H-2 Gives Details

HERMAN PNEUMATIC MACHINE COMPANY

GENERAL OFFICES: Union Bank Building PITTSBURGH, PA.

MANUFACTURING PLANT: ZELIENOPLE, PENNSYLVANIA, U. S. A.

Foreign Works: Pneulec Limited, Mafeking Rd., Smethwick, near Birmingham, England

Hartung Aktiengesellschaft, Berlin, Lichtenberg, Germany

Gibson Battle & Co., Limited, Sydney, N. S. W.

(*Concluded from page* 48)

and would be welcomed by American foundrymen. According to Captain Shane's report infinite pains are taken and every feature in the construction of a steel casting from design to cleaning, is thrashed out thoroughly before the first pencil is placed on the drawing paper.

The opinion of the master molder is considered as important as the opinion of any other member of the council. If necessary, the original design is modified to bring the production of the casting within the range of practical accomplishment without sacrificing any of the essential features. If that practice were more widely observed in this country it is quite probable that the failure of the stern casting on the scout cruiser would not have occurred. However, the failure, regrettable at the time, may have been a blessing in disguise since it has helped to clarify the situation through the expressed opinions of so many prominent men.

This is the fourth and last of a series of articles dealing with the discussion which followed the presentation of a paper on steel castings technique in Europe.—THE EDITORS.

Demands Two Heats Daily

(*Concluded from page* 21)

employed 22,320. Operations in 1929 were 71.2 per cent of capacity. At this rate, based on a 40-hour week, there would be required 48,469 employes. When the operations of the industry reach 55.7 per cent of capacity, the same number of employes, namely, 38,015, will be required as were employed in January, 1929. It is thus evident that to reduce the permissible maximum hours per week provided in the code, would work a hardship on many members of the industry, due to their inability to obtain locally, skilled foundry workers—not just men.

There is no way that the industry can suggest whereby a surplus of men in any given locality could be transferred to make up a deficit in some other locality, nor, due to the intimate relationship between purchaser and producer, is it possible to allocate work to take up the surplus labor in any locality.

The code establishes a minimum rate of from 30 to 40 cents per hour for common male labor depending on the rate paid on July 15, 1929. The minimum rates paid common male labor have been as follows: Jan. 1, 1929, 39 cents; Jan. 1, 1933, 29 cents; June 15, 1933, 28 cents; Aug. 15, 1933, 36 cents.

The reports show that upon the adoption of the labor rate specified in the code, the average minimum rate for common male labor will be 38.7 cents, an increase over the 28 cents paid on June 15, 1933, of 38 per cent.

Practically all labor operations in the malleable iron industry are paid for on a piecework basis. Records over a great many years show that the average earnings for the common laborers, or the nonskilled class, will be substantially greater than the minimums specified in the code.

It will be noted that the code provides for equitable adjustment in all pay schedules of plant employes above the minimum rates shown.

Exactly 50 per cent of the producers in the industry report the employment of female plant labor. Of those plants that employ female labor, about 7 per cent of their total employes are females. The approximate normal relation of the hiring rate or hourly earning rate of female workers to that of male workers is 75 per cent.

It is the consensus of opinion in the industry that until such time as the demand for its products cannot adequately be met by the fullest possible use of existing capacity for producing malleable iron castings, such capacity should not be increased. This opinion is based on and evidenced by the fact that even in the peak years of 1928 and 1929, operations were respectively only 67.9 per cent and 71.2 per cent of the rated capacity based on past performance. In no month of the 9½-year period since the department of commerce has been gathering monthly production statistics did operations for the industry as a whole exceed 88 per cent, and in no consecutive 6 months' period of the 9½ years did operations exceed 81 per cent. As noted previously, the 6-year period, 1925-1929, can be looked upon as at least normal, during which time operations averaged 60.1 per cent.

Any effort to improve market conditions and practices in the malleable iron industry presents special difficulties due to the following factors:

(a) All malleable castings are custom made for individual orders to meet particular specifications;

(b) Actual costs of producing any individual casting cannot be predetermined accurately;

(c) Costs of the same casting will vary greatly at different periods, with different workmen, and under different production conditions in the same plant;

(d) The portion of the total cost of producing castings represented by overhead items is large and varies greatly with different plants and under different producing conditions.

For the foregoing reasons, any industry program to prevent price discrimination and market demoralization, such as characterized the industry for the past 7 or more years, which is based on prohibition against selling below individual costs is impracticable of operation.

Therefore, for the industry to be in a position to meet the substantially higher costs caused by approval of the wage and hourly rates in the proposed code, some practical method of determining fair and reasonable minimum costs is essential. The proposed code authorizes the industry, subject to the approval of the administrator, to develop such fair and reasonable minimum costs based on efficient plant operation, and to establish these for the different classifications of the products.

Prepares Code

FORMAL hearing of the code of fair competition of the malleable iron casting industry, held in Washington on Oct. 2, included a statement of certain important conditions in the industry. This article represents a part of the presentation by R. R. Fauntleroy, in behalf of the board of directors of the Malleable Founders' society, and relates to distribution of production, capacity, hours of labor, wages and cost methods.

Mr. Fauntleroy also pointed out that the sole purpose of the Malleable Founders' society was the formulation and administration of the code of fair competition. Work of the Malleable Iron Research institute, the trade association, which, during the past 30 years has served the industry in co-operative laboratory, metallurgical and sales promotional work, will continue without change.

The Malleable Founders' society, at the time the code was presented, had a membership representing 95 per cent of the producers of jobbing work and 53 per cent of producers of work made exclusively for their own use. The 96 companies represented in the society have a total invested capital of about $105,000,000 and an estimated payroll in a normal year of approximately $55,000,000.

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McCULLOUGH-DALZELL CRUCIBLE CO.

Pittsburgh, Pa.

Milkman keeps up with the times

The Adventures of Bill

BY PAT DWYER

ALTHOUGH I cannot prove the point, I am inclined to the opinion that the sight of a milk wagon rattling down the street prompted Bill to ask if I remembered the old nonsense rhyme; 'I never saw a purple cow, I never expect to see one; but just the same I'd rather see a purple cow than be one!'

"Seems to me," I admitted, "that some lingering echoes still remain of that noble example of the poetic art. In fact that particular rhyme formed part of the repetoire with which I was wont to entertain certain immediate relatives at that interesting stage of development after they had learned to talk, but before they had learned to read. Most of their conversation consisted of short sentences punctuated by question marks. Purely as a measure of self defense, a measure calculated to keep my mind from dwelling too intensely on items of personal violence, I adopted the system of introducing bon mots from the poets—see purple cow, etc.—at suitable intervals.

"The system, if I may illustrate it in another manner, bears a striking resemblance to the system followed in the old story book, by travelers pursued by wolves on the Russian steppes or in the dense forests which always occupied the greater part of the space between the traveler's jumping off place and his destination.

"Touching on the subject of jumping off places I wonder if you have noticed that the meaning of the term has been completely reversed. In the dear dead days of old brown Dobbin, the jumping off place meant the end of the journey where the traveler jumped off or out of the conveyance. In recent years since the advent of flying machines the jumping off place marks the point of departure. To the student of words this point opens an interesting field for speculation: (a) Does this reversal of meanings merely indicate the modern passion for change, or (b) is it due to the fact that so many aeronauts come down kerplunk instead of gaily jumping off at the end of the journey."

"Well," said Bill, "since you have been kind enough to ask my opinion on the subject I should say you are better qualified than any other person to answer that question. As a plain and fancy jumper you can give cards and spades to any traveler, or for that matter to any of these here now Alpine billy goats—what do you call 'em, shammies—that go yodelling from eidelweis to eidelweis and from budweiser to pilsner throughout the long summer day and probably part of the night.

"You jump from a purple cow to a Russian mujik pursued by wolves and then calmly leave the poor gommoch, probably half eaten, while you jump into an aeroplane to go skyhooting after the meaning of a term familiar to every person with the possible exception of yourself. For heaven's sake quit jumping around. Keep your feet on the ground, your eye on the ball and your remarks on the point at issue. In other words what possible connection exists between the lyrical ballad of the purple cow and the Russian traveler dogged by a mob of long, lean and hungry wolves?"

The high hats may prove their salvation

"The analogy," I pointed out, "should be perfectly obvious to any person capable of keeping his mind for at least a minute on any given subject. The deplorable habit of mental jumping to which so many people are addicted, cannot be sufficiently condemned."

"Hear, hear, also har har!"

"Calmly ignoring the second and concluding portion of your interesting remarks," our hero continued, "I shall proceed *in re* the purple cow and the wolves. However, before plunging into the subject properly may I direct your attention to the fact that you were slightly astray in your quotation. In the original, with which as I said before, I have been familiar for many years the second sentence reads 'I never *want* to see one' and not as in your erroneous version 'I never *expect* to see one.'

"A moment's reflection, I am sure will show you that the word *expect* is too long. It throws the line out of plumb. A trifle of course you will say, but remember my boy trifles make perfection, and perfection is no trifle. In addition—"

"Never mind the addition," Bill interrupted "The thing is too long now. If you ask me I'll tell you what you want is subtraction and not addition. Cut it short."

"In addition," I said, "as I was about to remark before a low porcupine from one of the back benches rudely interrupted me, in addition I might say that the person who attempts to recite rhymes or tell stories to children is hemmed in and restricted by the most rigid rules and regulations. Children's memories cling to the original version as tenaciously as chewing gum to a little girl's hair or burdock burrs to a cow's tail. If you were to tell a child or a group of children one night that you never wanted to see a purple cow, and then on the following night, or on any following night told him, her or them, that you never expected to see one, your wheels would be spragged pronto. In the modern equivalent the clutch

would be out, the foot brake jammed on and the emergency pulled back to the last notch before you could say another word. No, no, my boy, You might impose to a certain extent on a child's intelligence, but according to personal experience, hearsay evidence and voluminous statistics compiled on the subject, no person ever has slipped anything over on a child's memory. Hence, as you may remember I said some time back, when I claim a certain familiarity with the words of a childish jingle, my feet are on solid ground."

"All right," Bill admitted wearily. "So's your head. So then what?"

Admirable! Neat, concise and to the point. Extremely gratifying to find one's hearers following the subject so closely. We now approach the most interesting feature on the agenda. A gent in the audience —I didn't quite catch the name, sounded like Mousetrap or Musquash, but of course, ha, ha, that cannot be right—a gent in the audience wants to know the exact relationship, if any, between a purple cow, a fox and a sheaf of wheat.

"What's that? Oh! Ah—my error. Inadvertently the question covering the cow slipped in with tentative copies of the codes prepared by the fox farmers and wheat speculators. The question really is: What possible connection exists between the ballad of the purple cow and the Russian traveler.

"In reply to same would beg to state that the gent's memory is slightly botty and spavined. What I said was that the system of introducing jingles and rhymes in the evening's entertainment is somewhat similar to the method practiced by Russian travelers pursued by wolves. These enterprising and resourceful individuals toss bundles of provisions, articles of clothing and what not, to the wolf pack when it creeps up too close for comfort or safety. The what not in a general way refers to one of the horses which is cut loose and left to its fate. With each delay while the wolves fight over what you might call the flotsam and jetsam, the traveler gains a little distance and perhaps eventually wins clear. In a similar manner I was accustomed to toss a jingle or rhyme to the ravening pack clamoring for stories and more stories and in that manner gained an occasional breathing space while the darling little wolves worried the rhymes in an effort to memorize them."

"Well," said Bill, "I'll tell you. That system might work with children, but it would not suit the lads who write to me every now and again to supply answers to a wide variety of questions. For example a man wrote to me recently to the effect that he was collecting data on conventional methods for filing and indexing drawing and patterns. How should he list patterns used in various combinations. How are production machines numbered, as a straight serial list, or, as plain lathe No. 47, multiple lathe No. 3, etc. How is equipment classified in an alphabetical index. For example would a furnace employed in annealing pipe be listed under *F*, *A*, *E* or *P*, thus: Furnace, annealing; Annealing furnace; Electric furnace; or Pipe annealing furnace.

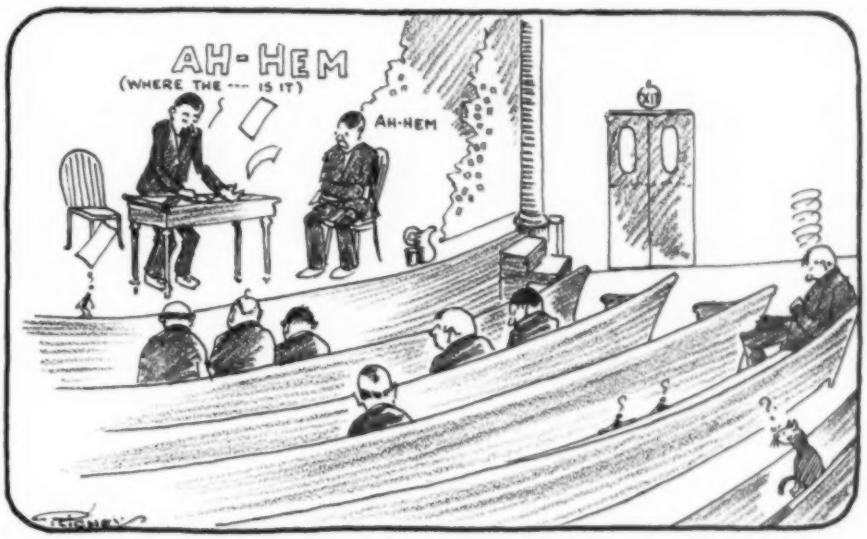
"Owing to the variation in detail of operation, size of the plant, character of product and many other factors, nearly every foundry which has an index or card file system for patterns and drawings, has developed one to fit its own peculiar conditions. The tendency among the majority of men is to follow the line of least resistance. Coupled with this in some instances we find a resistance to any innovation which entails initial expense. Thus in many foundries we find one man carries a complete record in his mind, drawings, patterns, customers, casting weights, equipment and every other factor which enters into the production of castings.

"The system employed where the foundry is part of a manufacturing plant, would not serve in a general jobbing foundry catering to a miscellaneous list of customers. The system in use in a specialty shop concentrating on one or two items would not apply in a foundry where the variation in product is almost infinite.

"In a general jobbing foundry the drawings and patterns may be classified first under the customers names. Each of these general classes then is subdivided under as many heads as may be considered necessary and the patterns are given an identifying letter and number. In a manufacturing plant, for example, the patterns could be grouped first under such general headings as pumps, engines, rock crushing machinery, hydraulic, etc. Individual patterns under these headings then might be given identifying letters and numbers. Further subdivision may be effected by an almost endless variety of letters and numbers. For example one series might be marked A-1, A-2 and so on up to A-1000. A second series starts with 2A-1 and so on. Articles on the numbering and filing of pattern records appeared in THE FOUNDRY for March 1, and Aug. 15, 1927 and Feb. 1, 1928 and on other occasions.

"The same general rule holds for the filing and indexing of equipment data. All the information is grouped first under a number of definite heads, and then re-distributed under a number of lesser heads. For example the first distribution might include all the equipment in the main divisions of the foundry and be listed under Molding, Melting, Coremaking, Cleaning. Each one of these is broken down as far as may be necessary and each of the items filed under the proper subhead. The general rule in filing is to use the main term first and auxiliary or explanatory terms after it. Thus the annealing furnace would be filed under the letter *F* as *Furnace, pipe annealing*, and would be grouped with all other furnaces in use in the plant.

"The same rules hold with the classification of machines. In the foundry each one is given a number and this number is filed in a list under a heading indicating the type of machine. Each filing card also can carry any additional information necessary, either for production or appraisal purposes. For example: Molding machine No. 1, Combined jolt ram, pattern draw; take flask 24 x 36 x 10, new (or second hand) 1930, The Jolter Machine Co., $500.00."



Pending further announcement the audience has legged it for a quick one

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TRUSCON FOUNDRY FLASKS AND ACCESSORIES

The experience of foundries everywhere has proved the advantages of Truscon Foundry Flasks with their great strength and improved features. Available in all types and sizes from light bench to large power units. Every detail is designed for the job—for rapid and accurate molding—for minimum weight and easy handling. They give long life right through the hard knocks and abuse of daily service.

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FLINT SHOT gives a class of finish impossible to duplicate with any other forms of abrasives. It's round, pearlike granules are as hard and sharp as flint. Does not split up, only wears down and can be used over and over again many times. It flows freely, requiring less air power. FLINT SHOT LASTS. Relatively dustless.

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Engineering Service Gratis.

Three plants to meet your needs with dispatch.

Washed, Dried and Screened Special Sands for
Steel Moulding
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Cores, Openers
And Silica Flour.

OTTAWA SILICA COMPANY

Ottawa, Illinois

NonferrousFoundryCode

(*Continued from Page 20*)

as a supplemental code of fair competition for the Aluminum Permanent Mold Castings division of the nonferrous foundry industry.

1. Definition of Terms

(a) The term "aluminum permanent mold casting industry" means and includes that division of the nonferrous foundry industry, as defined, engaged in the business of producing aluminum and aluminum alloy castings made with permanent or semipermanent molds except die castings and aluminum piston and such equipment therefor as is regularly manufactured in plants of members of the division.

(b) The term "members of the Aluminum Permanent Mold Castings division" means and includes, without limitation, every individual firm, partnership, association, corporation or other entity engaged in business in the aluminum permanent mold castings industry as above defined.

2. Adoption of Code Submitted by the Nonferrous Foundry Association for Industrial Recovery

The members of the Aluminum Permanent Mold Castings division of the nonferrous foundry industry hereby adopt and submit as a part of this supplemental code, the code submitted for the nonferrous foundry industry by the Nonferrous Foundry Association for Industrial Recovery.

3. Unfair Methods of Competition

To accomplish the purposes contemplated by this act, the members of this division of the nonferrous foundry industry agree that the following practices are unfair methods of competition, insofar as they relate to the production and/or sale of permanent mold and semipermanent mold castings and subject to the penalties provided in the National Industrial Recovery act.

(a) Violation of any of the provisions of this code or amendments thereto.

(b) To give, or permit to be given, to agents or employes or representatives of customers, or agents, employes, or representatives of competitors or of prospective customers, money, or anything of value, to induce them to influence their employers, or principals, to purchase, or contract to purchase products of this industry, or to influence such employers, or principals to refrain from contracting with competitors.

(c) Undertake to do work or furnish castings on terms other than those set forth in the contract between the parties.

(d) In making quotations on permanent mold or semipermanent mold castings, estimated weights shall be stated in the quotation and the piece price for delivery shall be adjusted for any difference in weight in excess of 5 per cent between actual weight and estimated weight. This adjustment to be made on the basis of melted metal costs as provided in the system of cost accounting as adopted under Article III, paragraph (m).

(e) Purchase from customers goods, scraps, borings, and/or services at prices higher than the market for the purpose of influencing or inducing the purchase of nonferrous castings.

(f) Absorb all or any part of the machining cost of castings sold as machined castings.

(g) Enter into quantity contracts with buyers without obligation on their part to take delivery of the quantities specified in the contract or on the quotation, for the purpose of giving special unwarranted prices.

(h) Accept requirements contracts without a specific minimum which shall not be less than 75 per cent of the maximum and without specifying a time limit, except where such contracts permit of a price adjustment on date of release of quantities under the contract.

(i) To defame or disparage a competitor directly or indirectly, by words or acts, which untruthfully impugn his business integrity, his ability to keep his contracts, his credit standing, or the quality of his products; or marking, branding, labelling products, and making statements regarding products, the purpose or effect of which may be misleading or tend to deceive purchasers as to the quantity, quality, grade, or substance of the goods purchased.

(j) Maliciously entice away the employes of competitors for the purpose and effect of unduly hampering, injuring, or embarrassing competitors in their business.

(k) Cancel in whole or in part or voluntarily permit the cancellation in whole or in part of any contract of sale of any product, except for a fair consideration, which consideration shall include any expense incurred prior to acceptance of cancellation and any difference due to a decline in metal market prices between date of order and date of cancellation is requested.

(l) Make any sale or contract of sale of any product of any description protecting against a metal market decline.

(m) Make any sale or contract of sale for any castings below the seller's cost as determined by a system of costing which conforms to the principles of and is at least as complete and detailed as the system of cost accounting adopted by this division and approved by the Administrator.

(n) Guaranteeing the life or service of an aluminum permament mold casting, provided, however, that nothing in this paragraph is to be construed as to hinder the development of new uses.

(o) Quote a flat price per pound for a variety of castings of widely varying weight and/or intricacy.

(p) Absorb the cost of patterns, dies, permanent molds, tools, gauges, core driers, chemical analyses and/or physical tests specified by the purchaser or any special equipment in the casting price and/or charge for such equipment at less than its actual cost including direct labor, full overhead, materials, and supplies, provided, however, in the case of development of new uses, and/or processes, the cost of development or the excess cost of molds over their cost of reproduction may not be charged to the customer.

(q) Make chemical analyses and/or physical tests specified by the purchaser without making an additional charge to cover entire cost of such test specimens and tests.

(r) Accepting permanent mold equipment made by another permanent mold manufacturer in this group and supplying production castings from such equipment.

(s) Quoting or accepting orders for molds, dies, or any special equipment necessary to the manufacture of a particular casting without including in the quotation or order an amount separate and apart from the cost of the casting sufficient to cover the cost of such molds, dies, or other special equipment, nor to extend terms for the sale of such molds, dies, or special equipment other than net cash on approval of samples or than the payment therefor in equal monthly installments covering a period of not to exceed 6 months. In the event that installment terms as herein provided are granted, there should be added a carrying charge at the rate of 2 per cent per month for such period of time as such terms are granted.

(t) To make any additional mold equipment to meet a customer's production requirements, without charging for same at not less than cost.

(u) To give any cash discounts on billing or to extend terms of payment for the purchase of the products of the industry for more than 30 days.

(v) Accepting orders which do not specify a definite quantity or which extend the time of delivery beyond 120 days from date of order for new castings or 90 days from date of order on re-orders of castings previously furnished.

(w) To cancel or renew the unfilled balance of any order at a lower price without a charge equivalent to any loss occasioned by a decline in the value of the metal as determined by the average price at date of order and date of cancellation average price of metal to be determined as in the system of cost accounting as defined in paragraph (m).

(x) To renew the unfilled balance of any order except that such renewal be subject to the provision of (m) above.

4. Fair Methods of Competition for the Industry

(a) Where a member of the aluminum permanent mold castings industry produces more than one product, each separate product shall be considered as a separate unit for the purpose of ascertaining costs and in determining such costs, fair and proper allocation of general expenses shall be allocated to the several units.

(b) All quotations, orders, or contracts covering molds shall contain a provision reading as follows:

"The above-described molds will remain in our possession and control, and when, for three consecutive years, no orders are received, the molds will be considered as obsolete and may be destroyed by us after giving 30 days notice thereof to the customer. The process of construction and operating these molds will not be disclosed to any one except employes of our company."

(c) All quotations, orders, or contracts covering castings shall contain a provision reading as follows:

"The molds from which the above-described castings will be made, will remain in our possession and control, and when for three consecutive years, no orders are received, these molds will be considered obsolete and may be destroyed by us after giving 30 days notice thereof to the customer. The process of construction and operating these molds will not be disclosed to any one except employes of our company."

SUPPLEMENT TO CODE OF NONFERROUS FOUNDRY INDUSTRY SUBMITTED BY THE STEEL AND ROLLING MILL CASTINGS DIVISION OF THE NONFERROUS FOUNDRY INDUSTRY

To effectuate the policies of Title I of the National Industrial Recovery act, the following provisions are established as a supplemental code of fair competition for the Steel and Rolling Mill Castings division of the nonferrous foundry industry.

1. Definition of Terms

(a) The term "Steel and Rolling Mill Castings Industry" means and includes that division of the nonferrous foundry industry as defined, engaged in the business of producing nonferrous castings for steel plants and rolling mills except blast furnace castings.

(b) The term "Member of the Steel and Rolling Mill Castings division" means and includes, but without limitation, every individual, firm, partnership, association, corporation, or other entity engaged in business in the steel and rolling mill castings industry as above defined.

2. Adoption of Code Submitted by Nonferrous Foundry Association for Industrial Recovery

The members of The Steel and Rolling Mill Castings division of the nonferrous foundry industry hereby adopt and submit as a part of this supplemental code, the code submitted for the nonferrous foundry industry by the Nonferrous Foundry Association for Industrial Recovery.

3. Unfair Methods of Competition

To accomplish the purposes contemplated by this Act, the members of this division of the nonferrous foundry industry agree that the following practices are unfair methods of competition, insofar as they relate to the production and/or sale of the products of the division and subject to the penalties provided in the National Industrial Recovery Act:

(a) Violation of any of the provisions of this code or amendments thereto.

(b) To give, or permit to be given, to agents or employes or representatives of customers, or agents, employes or representatives of competitors or of prospective customers, money, or anything of value, to induce them to influence their employers, or principals, to purchase, or contract to purchase products of this Industry, or to influence such employers, or principals, to refrain from contracting with competitors.

(c) Undertake to do work or furnish castings on terms other than those set forth in the contract between the parties.

(d) Withholding from, or inserting in any invoice, words or figures which make or tend to make such invoice a false record, wholly or in part, of the transaction represented on the face thereof, and of the payment or allowance of secret rebates, refunds, credits, unearned discounts, whether in the form of money or otherwise; or the extension to certain purchasers of prices of services or privileges not extended to all purchasers under like conditions.

(e) Purchase from customers goods, scrap, borings, and/or services at prices higher than the market for the purpose of influencing or inducing the purchase of nonferrous castings.

(f) Absorb all or any part of the machining cost of castings sold as machined castings except specialty castings.

(g) Enter into quantity contracts with buyers without obligation on their part to take delivery of the quantities specified in the contract or on the quotation, for the purpose of giving special unwarranted prices.

(h) Accept requirements contracts without specifying a time limit, except where such contracts permit of price adjustments to conform with metal market advance and/or declines at least once monthly.

(i) To defame or disparage a competitor directly or indirectly, by words or acts, which untruthfully impugn his business integrity, his ability to keep his contracts, his credit standing, or the quality of his products; or marking, branding, labelling products, and making statements regarding products, the purpose or effect of which may be misleading or tend to deceive purchasers as to the quantity, quality, grade, or substance of the goods purchased.

(j) Maliciously entice away the employes of competitors for the purpose and effect of unduly hampering, injuring, or embarrassing competitors in their business.

(k) Cancel in whole or in part or voluntarily permit the cancellation in whole or in part of any contract of sale of any product, except for a fair consideration which consideration shall include any expense incurred prior to acceptance of cancellation and any difference due to a decline in metal market prices between date of order and date cancellation is requested.

(l) Make any sale or contract of sale of any product of any description guaranteeing against a metal market decline.

(m) Make any sale or contract for sale of any castings below the seller's cost as determined by a system of cost accounting which conforms to the principles of and is at least as detailed and complete as a standard method of cost accounting to be formulated and adopted by this division and approved by the Administrator.

(n) Guaranteeing the life or service of a nonferrous casting.

(o) Quote a flat price per pound for a variety of castings of widely varying weight and/or intricacy.

(p) Absorb the cost of patterns, dies, permanent molds, tools, gauges, core driers, chemical analyses and/or physical tests or any special equipment in the casting price and/or charge for such equipment at less than its actual cost including direct labor, full overhead, materials, and supplies except specialty castings.

(q) To accept any contract or order on a consignment basis.

Supplement to Code of Nonferrous Foundry INDUSTRY SUBMITTED BY THE BLAST FURNACE CASTINGS DIVISION OF THE NONFERROUS FOUNDRY INDUSTRY

To effectuate the policies of Title I of the National Industrial Recovery act, the following provisions are established as a supplemental code of fair competition for the Blast Furnace Castings division of the nonferrous foundry industry

1. Definition of Terms

(a) The term "Blast Furnace Castings Industry," means and includes that division of the nonferrous foundry industry, as defined, engaged in the business of producing nonferrous castings for blast furnaces, such as tuyeres, cinder notches, coolers, bosh mantle and inwall plates, hot blast valves, and valve seats.

(b) The term "Member of the Blast Furnace Casting's division" means and includes, but without limitation, every individual, firm, partnership, association, corporation, or other entity engaged in business in the blast furnace castings industry as above defined.

2. Adoption of Code Submitted by Nonferrous Foundry Association for Industrial Recovery

The members of The Blast Furnace Castings division of the nonferrous foundry industry hereby adopt and submit as a part of this supplemental code, the code submitted for the nonferrous foundry industry by the nonferrous Foundry Association for Industrial Recovery.

3. Unfair Methods of Competition

To accomplish the purposes contemplated by this act, the members of this division of the nonferrous foundry industry agree that the following practices are unfair methods of competition, insofar as they relate to the production and/or sale of blast furnace castings, and subject to the penalties provided in the National Industrial Recovery act.

(a) Violation of any of the provisions of this code or amendments thereto.

(b) Make or promise to any purchaser or prospective purchaser, or to any officer, employe, agent, or representative of any such purchaser or prospective purchaser, any bribe, commission, or split commission, gratuity, gift, or other payment or remuneration directly or indirectly.

(c) Withholding from, or inserting in any invoice, words or figures which make or tend to make such invoice a false record, wholly or in part, of the transaction represented on the face thereof, and of the payment or allowance of secret rebates, refunds, credits, unearned discounts, whether in the form of money or otherwise; or the extension to certain purchasers of services or privileges not extended to all purchasers under like conditions.

(d) Extend to any purchaser special concessions in the nature of free machining not standard as of July 1, 1933, and defined as follows:

Tuyeres.—Drill and tap holes; machine seat for blow pipe.

Cinder notches.—Tuyere coolers, notch (or intermediate) coolers, bosh plates, mantle (inwall) plates; drill and tap holes.

Hot blast valves and hot blast valve seats.—Follow blueprint furnished by purchaser. To remachine a valve or seat after it has been shipped to a purchaser (except to correct an error) constitutes an unfair method of competition.

To machine outside surface of tuyere fit or inside surface of cooler fit without charging purchaser full cost of such extra machining constitutes an unfair method of competition. However, filing or grinding smooth where necessary is allowable without extra charge.

(e) Enter into quantity or period contract with any purchaser without obligation on purchaser's part to take specified minimum poundage which shall not be less than 75 per cent

(*Concluded on Page* 58)

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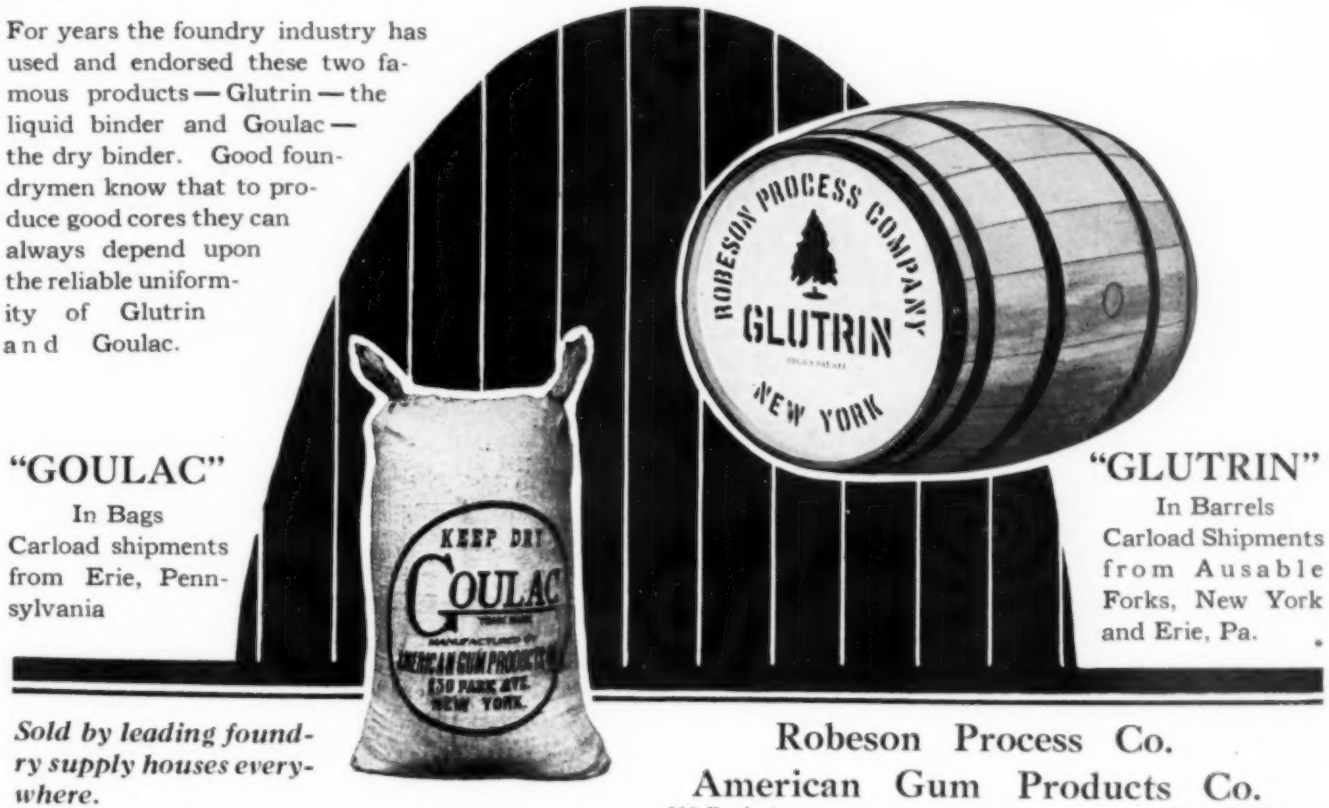

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STOCKS AT principal cities

The Alpha-Lux Company, Inc.
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Philadelphia Chicago

(*Continued from Page* 56)

of the maximum, except where such contracts permit of price adjustments to conform with metal market advances and/or declines at least once monthly.

(f) Maliciously entice away the employes of competitors for the purpose and effect of unduly hampering, injuring, or embarrassing competitors in their business.

(g) In case of change or cancellation of order in process, purchaser shall be charged full amount of expense incurred prior to acceptance of cancellation and any difference due to a decline in the metal market prices between date of order and date cancellation is requested.

(h) Make any sale or contract of sale guaranteeing against a metal market decline.

(i) Make any sale or contract of sale for any castings below the sellers' cost as determined by a system of cost accounting which conforms to the principles of and is at least as detailed and complete as a standard method of cost accounting to be formulated and adopted by this division and approved by the Administrator.

(j) Guaranteeing the life of a blast furnace casting.

(k) Requote a price lower than a competitor's price after being advised what that competitor's price is.

(l) Accept any contract or order on a consignment basis, or with the understanding that shipment is to be held back pending customer's specification, or on any other delivery basis than that of shipping when ready, and invoicing as of date of shipment and on terms specified in paragraph (m).

(m) Terms of payment shall be: Net 30 days from date of shipment. A discount of ½ of 1 per cent may be allowed for earlier payment.

(1) On invoices for castings dated from the 1st to the 10th, inclusive, in any month, such discount may be allowed on payment of such invoices on or before the 20th of such month:

(2) On invoices for castings dated from the 11th to 20th, inclusive, in any month, such discount may be allowed on payment of such invoices on or before the 30th of such month: and

(3) On invoices for castings dated from the 21st to the end of any month such discount may be allowed on payment of such invoices on or before the 10th of the next following month.

(n) All shipments shall be invoiced in cents per pound for the actual shipping weight.

European Founders Meet at Prague

(*Concluded from Page* 28)

Ceskomoravska-Kolben-Danek (cast-iron, malleable iron, steel and nonferrous metal foundries), the Prague Iron Works, the Poldi Steelworks, and the United Carborundum & Electrite Co. On Monday afternoon the congress left Prague for Moravska Ostrava, near the Polish border. This is a large coal, and iron and steel center, and an opportunity was given to visit the blast-furnaces, steelworks and foundries of the Vitkovice Mines, Steel & Iron Works Corp., and of the Mining & Iron Works Co. at Trinec. Two coke plants were also visited: the Karoline plant at Vitkovice, and the Frantisek plant.

On Wednesday the party left Moravska for Zlin, where they visited the foundry and other works of the Bata Shoe Corp., the organization of which, from the standpoint of modern mass-production equipment, and social and welfare schemes, compares only with that of the Ford company. The next day, at Brno, visits were paid to the machine factory of Brno-Kralovopolska strojima (cast-iron and nonferrous metal foundries) and the cast-iron foundry of Prvni Brnenska strojirenska spolecnost. Delegates also were invited by Prof. Pisek to visit his laboratories at the Technical High School, of which he is director. On Friday the party was at Plzen, where they visited the world-famous Skoda works, and the Citizen's Brewery and on the following day the tour concluded with a visit to the West Bohemian Factory of Kaolin and Refractory Materials.

During this tour, a small delegation of foreign representatives left Moravska Ostrava to visit President Mazaryck of Czechoslovakia at his summer residence at Topolcianky. The delegation was headed by W. M. Geesteranus, president of the International Committee of Foundry Technical Associations, and by Professor Pisek, president of the Czech foundry association.

The program of social functions was very complete and included a reception by the Mayor of Prague in the Town Hall, lunches and dinners, receptions for the ladies of the party, and the official banquet at Plzen.

Discusses Buying And Selling of Castings

Practices in buying and selling of castings provided the topic for discussion at the monthly meeting of the Chicago Foundrymen's club, held at the Great Northern hotel Nov. 2. About 60 members attended, with President Gottfrid Olson presiding. David Evans, president of the Chicago Steel Foundry Co., spoke on "Casting Salesmanship" while F. J. Heaslip, purchasing agent of Fairbanks, Morse & Co., presented the viewpoints of the buyer in a talk on "Casting Buying."

Admitting that there is no formula by which the casting seller may be certain to dispose of his product, Mr. Evans cited various factors which are essential parts of good salesmanship, emphasizing the importance of knowledge of castings and their applications as well as of the needs of the buyer. Ideas concerning the improvement of the customer's casting design occasionally are more important than merely the product itself, he pointed out.

Mr. Heaslip's remarks on the buying of castings, to a certain extent, served also as suggestions for better salesmanship. He recommended that the foundry be as conversant as possible with the needs of the consumer before making sales calls. In buying castings, the importance of price should not overshadow quality of work, availability of castings when required or the responsibility of the foundry, and the movement toward equalization of prices, resulting from the NRA codes, now places increased emphasis on the latter qualifications in the placing of orders, he observed. In this connection also Mr. Heaslip recommended that special attention be given to cleanliness of castings, removal of gates and risers and chemical and physical characteristics.

In general discussion following the talks, the subject of pricing by piece and by pound was considered. Both methods have their advantages and disadvantages, it was agreed. A piece price basis on occasions leads to improvement in the design of castings at the suggestion of the foundry. Discussing the matter of chemical and physical specifications, it as the opinion that in general chemical properties can better be decided upon by the foundry to suit the physical characteristics desired rather than by an arbitrary setting of both sets of values by the purchaser. A tieup of both chemical and physical specifications frequently is unnecessary and occasionally results in a more expensive product than when some changes, which do not affect physical properties, are permissible in chemical contents.

Detroit Foundries Hold Meeting in Flint

The second meeting of the 1933-34 season of the Detroit Foundrymen's association was held at Flint, Mich. Oct. 19, with 110 members and guests present. R. J. Rogers, foundry manager, Buick Motor Co. was general chairman.

George P. Christopher, vice president in charge of plant operations, Buick Motor Co. presented a brief introductory address. Arthur Sarvis, Buick Motor Co., then presented an illustrated talk on "Twenty-five Years of Automobile Progress," and Peter W. Blackwood, foundry superintendent, of the Buick company spoke on "Twenty-five Years Progress in Iron."

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Hot-Blast Process
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THE Griffin Hot-Blast Process reduces coke consumption more than 25 per cent, permits the safe use of more scrap in the charges, improves the melting and pouring practice at every stage from start to finish, promotes safety, assures greater uniformity and better quality of the finished castings and greatly reduces rejection losses.

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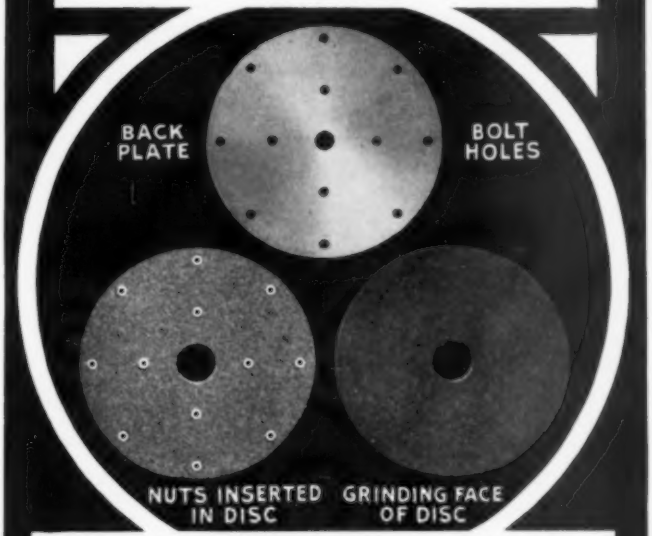

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STERLING CLEVELAND TRADE MARK ABRASIVES

Cleans Steel Castings by Washing

(*Continued from Page* 17)

rails, 16 feet long and 3 feet wide, which facilitate greatly handling crawler links from the shakeout through the washer, to the flame floor and then to the railway cars. Previously these links were taken from the blast room and placed on the floor so that the operator of the cutting torch could walk around them. Now they are stacked on the rack in such a way that the operator moves along the rack, immediately after it is taken from the washing room, and performs all of the cutting work, thus saving considerable labor in handling that particular type of casting. Incidentally, the castings still are sufficiently warm when thay leave the washing room that the water dries almost immediately.

The washing unit, shown in several of the accompanying illustrations, was designed and built by the Pangborn Corp., Hagerstown, Md. It consists of a steel room 25 feet square on the inside and having an overall height above the floor level of 17 feet, 9 inches. To provide the necessary clearance for the crane serving that department, the floor of the unit has been built 2 feet below the floor level of the foundry bay, with a gradual slope provided from the foundry floor to the hydraulic cleaning room floor level. Red lights at several points on the top of the room serve as a constant reminder to the cranemen of the existence of this equipment in the main bay of the foundry.

Move the Roof

The two front doors provide an opening 15 feet wide and 16 feet high for moving the castings in and out of the room. The opening in the top of the room, shown in Fig. 1, permits the use of the traveling crane in placing the work on the turntable in the center. The roof opening is provided with a three panel, sliding type door which is actuated by a 5-horsepower motor riding on the front panel. The motor is operated by remote control with push buttons located at the front of the room as shown in Fig. 2. The opening in the roof, with the doors completely opened, is 16 feet 6 inches wide and 18 feet long. The roof doors are interlocking so that they are water tight when closed.

The two large doors on the front of the room are moved by hydraulic presure through individual cylinders located on the top of the room. One cylinder is provided for each door, as is shown in Fig. 2. The cylinders are designed to open and close the door with an easy, smooth motion, and also to hold the doors closed when the washing equipment is in operation. Rubber around the doors provides an effective seal against the escape of water. In fact the entire room is watertight when in operation. The control levers for the doors are located on the sides of the room, near the front. One control valve is shown around the corner from the door in Fig. 2. The valve has been placed at that position as a matter of safety, for the operator must be at the front of the room to operate the control, and therefore is in position to determine if the space is clear for the doors to swing.

Castings to be cleaned are placed on a 12-foot diameter, rotating table in the center of the room, as is shown in Figs. 1 and 4. The work may be held in circular baskets made of steel plate and rods, on racks as previously described in connection with the crawler links, or it may be placed on the table and secured with chains, stanchions, etc., as is illustrated in Fig. 4. The turntable has a capacity of 50 tons and is operated on steel wheels running on a track supported by the concrete foundation. The table has 12 equally spaced T-slots as well as a number of holes for stanchions.

The table is driven by a 10 horsepower waterproof motor through a reduction gear. The motor, supported on a bracket located above the water line in the sedimentation tank, which will be described later, is controlled through push buttons located at both the upper and lower operating stations. The table may be rotated in either direction, to permit the stream of water to strike the work at the angle desired by the operator.

As shown in Fig. 1, the room has two nozzles, one located above the other. These are operated from the two stations, shown in Fig. 3, either separately or simultaneously. A shatterproof window located immediately above each nozzle permits the operator to see the work in the room. The windows each have hand controlled washing devices which direct small streams of water against the glass to remove mud and dirt which may be thrown there by the force of the washing stream. The interior of the room is illuminated by four 500 and two 300 watt flood lights set in recesses in the wall and behind shatterproof glass. The floodlight windows also are equipped with window washers. The interior of the room first was coated with a heavy pitch paint, for protection, and then painted with aluminum paint to brighten the inside.

As may be noted in the illustrations, the operating stations are located at one corner so that the stream of water is directed across the diagonal of the room, thus permitting the greatest sweep of the work. The operator directs the stream of water by moving a bar which is direct connected to the nozzle. The bar is counterweighted to facilitate ease in handling. At both stations the operator has control of the water pump, the movement of the rotary table and the washers for the observation windows and the flood lights.

Water is supplied by a 3-stage, double suction, centrifugal pump, which takes it direct from the sedimentation tank through the pipe shown under the stairway in Fig. 3, and delivers it direct to the nozzles. The pump is driven by a 125 horsepower, direct connected motor. Since different sizes of nozzles may be used, the pressure at which the water is directed on the work varies with the size. When using two ½-inch nozzles simultaneously, the pump delivers water at 400 pounds per square inch pressure, handling 300 gallons a minute. With one ¾-inch nozzle the pump delivers 325 gallons a minute at 390 pounds per square inch pressure and with one 1-inch nozzle, the equipment handles 500 gallons a minute at 300 pounds per square inch pressure. The pressure is sufficient to knock rods and gaggers as well as the sand from the casting.

Does Not Bend Rods

The floor is covered with pans made from perforated steel plate, the inner row of pans being shaped to fit the contour of the table. Rods and gaggers are caught and once a week, pans are lifted out with the crane magnet and the contents removed. In contrast with the poking process, the washing method does not bend or break the rods and gaggers, and therefore they are ready for use as soon as taken from the pans. The floor in the room slopes toward one side, so that the sand and water flow through a narrow outlet about 8 feet long into the settling compartment.

The sedimentation or settling tank, where the sand is removed from the water, extends along two sides and the front of the room, a distance of 75 feet. The tank is 8 feet wide and 12 feet deep. A weir, extending from about one foot below the water line to the bottom of the pit, is located at about the center of that part of the tank which includes the intake. Experience has shown that this weir holds back practically all of the sand. Weirs also are located at the two right angle turns in the tank.

Sand collected in the sedimentation tank is removed twice a week. Of course the amount of work which is washed in the room will govern the cleaning periods. The water is allowed to drain back into the tank and then the sand is taken to the yard for storage. The company is not using that material at present.

(*Concluded on Page* 63)

ADVERTISING PAGES REMOVED

(*Concluded from Page* 60)

but is making tests with the washed sand and the backing sand in the foundry to determine in just what way the sand recovered from the sedimentation tank may be used. As a safety feature, an outlet to the sewer is provided at the far end of the tank, so that the water in the tank cannot extend above the outlet level. The water is used over and over again and only a small amount of new water is added to the system. Tests of the water at the pump intake shows the absence of abrasive materials which would injure the pump.

From the wash room the castings follow the same path to the various operations as previously was the case. Large castings remain in the same department and the smaller work is hauled to the second cleaning department. The working conditions in that part of the plant have been improved greatly through the installation of the washing machine, since castings are received entirely free from sand or dirt of any kind, and the former practice of blowing out pockets, boxes, etc. so that chippers could see where their operations were necesary, now has been eliminated entirely. As an additional housekeeping measure, the floor of the cleaning department is wet down good every night.

Both arresters and pressure blast rooms recently have been rebuilt. Ventilation within the room has been greatly increased and changed from updraft to down draft. Because the hydraulic washer leaves no sand to be blasted out of the castings, blasting is required only for removing scale formed during annealing.

Obituary

J H. GIBBONEY, 54, chief chemist, Norfolk & Western railroad, died in Roanoke, Va., on Oct. 30, following an abdominal operation. Mr. Gibboney was president of the American Society for Testing Materials in 1926-1927 and was previously a member of its executive committee and a vice president. He had been an officer of A. S. T. M. committee A-5 on corrosion of iron and steel since 1914; chairman from 1922 to his death. He was one of the six members of the important committee E-10 on standards and had been a member of committee A-1 on steel since 1913. Prior to his services with the Norfolk & Western, he was assistant chemist in the Virginia Agricultural experiment station; chemist of the Virginia Iron, Coal & Coke Co., and instructor in chemistry at Virginia Polytechnic Institute and chemist of the Virginia state geological survey. He was a graduate of the Virginia Polytechnic institute.

George C. Neilsen, 64, foundry superintendent, Letz Mfg. Co., Hammond, Ind., died Oct. 1.

John R. Robinson, 53, representative of the Harbison-Walker Refractories Co., Pittsburgh, died recently in Westbury, L. I.

John G. Bannister, 73, formerly vice president of the Walworth Co., Boston, and recently retired, died in his home in Phoenix, Ariz., Oct. 14.

Charles T. Robertson, for many years superintendent of the pattern shop of Mesta Machine Co., Homestead, Pa., died at Pittsburgh, Oct. 21, after a long illness.

Myron F. Westover, 73, who retired in 1928 after having been secretary of the General Electric Co. for 34 years, died at his home in Schenectady, N. Y., on Oct. 21.

James C. Burt, 69, president, Burt Foundry Co., Toledo, O., died recently in that city. Mr. Burt founded the company 20 years ago. It now is managed by his son, Reeve Burt.

J. C. Wasson, 66, retired purchasing agent, Pennsylvania Lubricating Co., Pittsburgh, died recently following an automobile accident near Asheville, N. C.

William T. McConway Jr., chairman of the board, McConway-Torley Corp., Pittsburgh, iron and steel foundry, died in Pittsburgh Oct. 16. Mr. McConway was a son of W. T. McConway, one of the founders of the company.

Ralph W. Cadman, 56, president, A. D. Cadman Mfg. Co., Pittsburgh, manufacturer of babbitt brass and bronze castings, died at Pittsburgh Oct. 14. Mr. Cadman had been president of the company since the death of his father.

Ole J. Lunde, 68, pioneer manufacturer of nonferrous castings in LaCrosse, Wis., died Oct. 14. Mr. Lunde was born in Lillehammer, Norway, and came to America in 1887, establishing his foundry in LaCrosse in 1890.

J. George Shaw, 67, founder and president of the former Milwaukee Steel Casting Co., died Sept. 26. After a long connection with the E. P. Allis Co., later the Allis-Chalmers Mfg. Co., he established his own foundry in 1905, disposing of the business in 1917 to retire.

Jacob M. Spitzglass, 64, vice president of the Republic Flow Meters Co., Chicago, died Oct. 1 in that city. Mr. Spitzglass was born in Russia and came to this country in 1914. He was the inventor of an electric device for the recording of the flow of fluids.

Howard Beecher Tuttle, 70, chairman of the board, Eastern Malleable Iron Co., Naugatuck, Conn., died recently at his summer home, Middlebury, Conn. Mr. Tuttle, member of one of the best known families in Connecticut, was also chairman of the board of the Naugatuck National bank and connected with other banks and industrial enterprises in the Naugatuck Valley district of Connecticut. He was a graduate of Yale, 1887. His father, Bronson Beecher Tuttle, was founder of the Eastern Malleable Iron Co.

Howard M. Bate, 62, a member of the firm of William T. Bate & Son, Conshohocken, Pa., until its dissolution in 1925, died at his home on Oct. 14 A member of a pioneer Conshohocken family, he received his education at Spring Garden institute and Ursinus college.

William H. Wallace, 78, one of the pioneer crucible builders and operators in Western Pennsylvania, died at Pittsburgh, Oct. 31. He was born in Philadelphia, went to Pittsburgh in 1888 and for 44 years was plant superintendent of the McCullough-Dalzell Crucible Co., Pittsburgh.

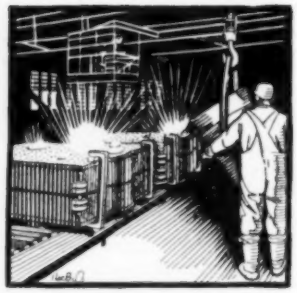
John Halter Killinger, 74, who at the time of his retirement several years ago was president of the Treadwell Engineering Co., Easton, Pa., died Oct. 24 in Pelham, N. Y. He was a mechanical engineer and also formerly was associated in an executive capacity with the M. H. Treadwell Co., manufacturer of steel castings and fabricated steelwork.

William C. Letchworth, 77, former general manager, Acme Steel & Malleable Iron Works, Buffalo, died in Buffalo Oct. 10. Mr. Letchworth formerly was associated with his father, Edward H. Letchworth in the operation of Pratt & Letchworth, Buffalo. He retired in 1923 and devoted himself to world travel.

Thomas W. Stone, 55, vice president and general manager of the Western Gas Construction Co., Ft. Wayne, Ind., died recently in that city. He was graduated from Ohio State university in 1902, going to Ft. Wayne at that time. Mr. Stone spent nearly all his industrial career with the Western Gas Construction Co., first having been identified with the company as a draftsman.

Patrick D. McDonnell, 73 for over 30 years foundry superintendent at the plant of the Fanner Mfg. Co., Cleveland, died at his home in Cleveland Oct. 12. He was born in Ireland, but as an infant accompanied his parents to the United States and resided in Cleveland for the past 70 years. He learned the molding trade and worked in several shops in the city before assuming charge of the Fanner Mfg. Co., foundry about 35 years ago. He retired from this position through illness about 2 years ago. He was active in political circles in the regime of Tom L. Johnson one time famous mayor of Cleveland.

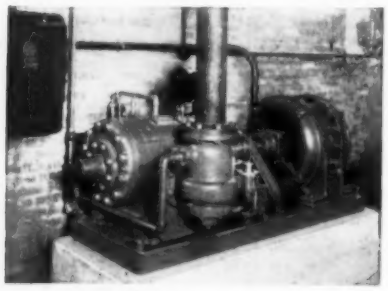
New Equipment



For Foundries

Introduces Line of Rotary Air Compressors

Allis-Chalmers Mfg. Co., Milwaukee, recently placed on the market a complete line of rotary air compressors and vacuum pumps of the multicellular, sliding-vane type in both water-cooled and air-cooled designs. One of the new single-stage water-cooled rotary air compressors is shown in the accompanying illustration. The line covers a range of volumes from 50 to 2000 cubic feet per minute at pressures up to 150 pounds, and vacuums up to 29.85 inches mercury. The air-cooled units are suitable for pressures up to 10 pounds gage and vacuums up to 18 inches mercury, and the water-cooled units for higher pressures and vacuums. Smooth operation, small dimension, continuous delivery and absence of maintenance requirements are a few of the features claimed for this line of rotary air compressors.



A new, single stage, water cooled air compressor

Spectacles Permit Wide Angle of Vision

New welding spectacles and a new lens for eye protection in oxyacetylene welding and cutting has been introduced by the Linde Air Products Co., 30 East 42nd street, New York. In the new type spectacle, lenses are mounted on a natural canvas-bakelite frame and are 50 millimeters in diameter. This width permits a wide angle of vision and gives protection against light and sparks.

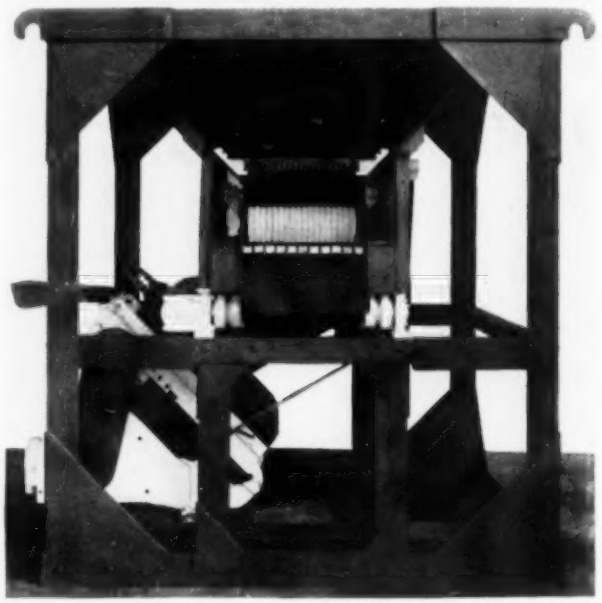
The bows are covered with insulating material and the frame is nonflammable and does not conduct heat. Through a snap device where the temples meet the frame it is possible to spread the frame and change lenses in a few seconds. The new lens, flat-ground and polished, is made in light, medium and dark green shades. It is claimed to have high protective qualities and its transmission percentages are said to meet rigid specifications for eye protection.

Removes Scrap And Blends Molding Sand

Royer Foundry & Machine Co., Wilkes-Barre, Pa., recently has introduced a portable machine incorporating a scrap remover and the sand separator and blender manufactured by that company. The machine is designed particularly for iron and steel foundries making large work, where it is employed in the preparation of backing sand. This machine, which is of rugged construction, is handled by a crane and loaded with a grab bucket.

Sand is tempered on the floor and is carried to the hopper, which is shown in the accompanying illustration, by the bucket. The hopper has a hog back grate which breaks the drop of the sand. A walking grate is located underneath the hog back grate to remove wedges, gaggers and foreign material and to screen the sand.

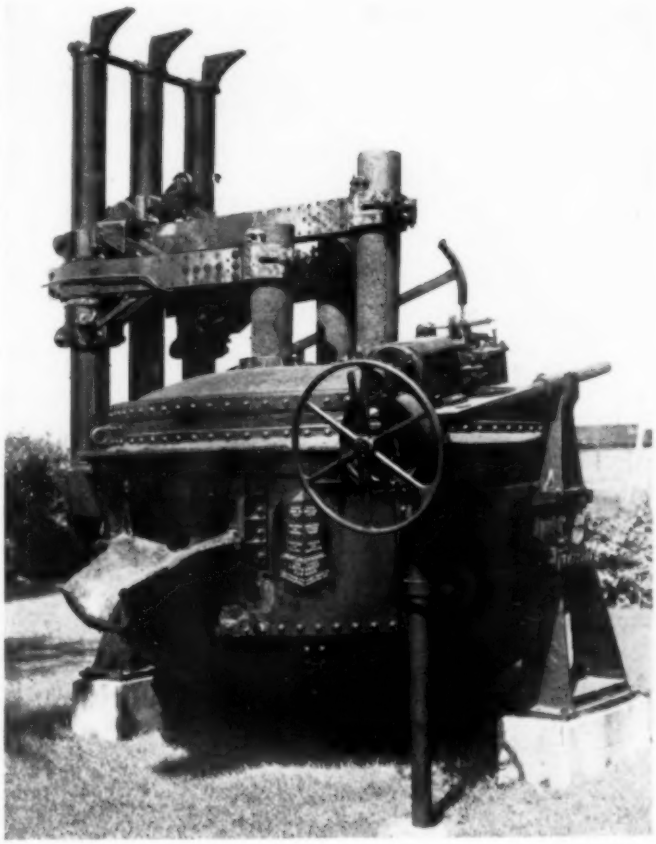
The sand then is fed into the separator and blender, where it is aerated and then piled. The separator and blender is built in two sizes, with capacities of 30 and 50 tons per hour respectively.



Scrap iron, wedges, gaggers, etc., are removed from the molding sand by a walking grate

Belt Is Flexible

A new belt featuring an endless-wound whipcord construction which it is claimed has no inelastic stretch, has been developed by the Manhattan Rubber Mfg. division, Raybestos-Manhattan, Inc., Passaic, N. J. It is pointed out by the manufacturer that the single layer cord section used in the belt is equivalent to six duck plies in strength and is many times more flexible.



RETIRED AFTER 32844 HEATS

This early type door charge Lectromelt furnace formerly used for 15 years by the Sivyer Steel Casting Co., Milwaukee, Wis., has now been replaced by a new LIFT and SWING - ASIDE - ROOF QUICK - TOP - CHARGE TYPE Lectromelt melting-refining furnace. A suitable cast steel tombstone, shown in the illustration, has been attached to the old furnace which has been erected as a permanent monument on the grounds of the Milwaukee Electric Railway and Light Company.

PITTSBURGH LECTROMELT FURNACE CORPORATION

Foot of 32 St., Pittsburgh, Pa. PO Box 1125

Standard Furnaces
25 pounds to 50 tons capacity

American Malleable Cast Iron

By H. A. Schwartz

This book is the first complete treatise on "black hearth" malleable iron ever published.

It covers the history of the malleable industry—its development, modern methods of manufacture, metallurgical principles involved and the properties and uses of American malleable cast iron. It also includes a detailed bibliography in which all the important books and articles published pertaining to malleable iron are listed and represents the only reference work available on the subject.

While written primarily for the producer and user of malleable castings, this book is also adapted to the needs of the technical student and the library.

"American Malleable Cast Iron" is the only book on malleable iron in print.

Price, Postpaid: $7.15 in U. S. and Canada; 35s. 9d. in other countries.

The Penton Publishing Company

Penton Bldg. ***Book Department*** **Cleveland, Ohio**
323-I. F. D.

SAND CONTROL

prepares you for
Quality Casting Competition

Moisture

Price competition is being eliminated. A new casting era is here. Quality Casting Era will create CASTING DESIRE which originates sales. Build up a Casting Pride in your foundry. It is all possible with the new tool Sand Control. The *Steel Age* will be succeeded by a *Cast Metal Age*. Start today to help create Casting Desire.

Write to us—Sand Control Equipment—Sand Research—Sand Problems

Permeability

Harry W. Dietert Co.

676 W. Grand Blvd. **Detroit, Mich.**

Grinder Has Heavy Cast Aluminum Housing

Chicago Wheel & Mfg. Co., 1101 West Monroe street, Chicago, recently introduced a portable electric grinder for rough grinding, touching off parts, tools and dies and for various grinding and sharpening work. The unit is driven by a universal motor operating on either alternating or direct current at 110 volts. The maximum speed of the tool is 17,000 revolutions per minute. The unit is provided with high-speed dust-sealed ball bearings.

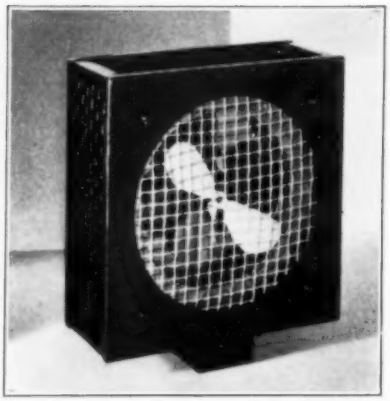
The motor housing is of heavy cast aluminum extending over the motor shaft. That portion is encased with an insulated, cushion grip which it is claimed gives the operator positive control and flexibility in use.

Three grinding wheels are supplied with the tool and over 100 shapes and sizes of wheels are available for use with that equipment.

Machines Roll Edges To Protect Belt

Jeffrey Mfg. Co., Columbus, O., recently has introduced a line of belt idlers which it is claimed provide belt protection, long reliable service and power economy. Outer shells of the rolls are made of high quality steel tubing, with full thickness of wall throughout the entire length. Steel ends are centered carefully and welded in the shells, forming virtually a one piece balanced roll. The welded edges of the rolls are machined to provide protection against injury to the belt.

Oversize tapered roller bearings of the self-aligning type are used. The bearings are mounted on specially selected cold rolled steel axle shafts. Bearings are protected against dirt by a double labyrinth grease seal. The outer deflector cup is shaped to continue the contour of the end of the roll so that material falling onto it is thrown away from the opening of the labyrinth.



A cutout protects the heater if the fan does not operate

A grease pocket is formed between the two bearings by a small tube, each end of which is secured to an inner extension of the end of the roll. This pocket provides sufficient grease reservoir for the bearings. A high pressure fitting on each roll provides an easy means of lubrication. One piece malleable iron stands, secured rigidly to a steel base, are slotted at the tops to receive and hold securely the hexagon heads and nuts of the axle shaft.

Air Is Drawn from Four Sides of Unit Heater

Edwin L. Wiegand Co., 7500 Thomas boulevard, Pittsburgh, has introduced a new unit heater which may be used for auxiliary, temporary or permanent heating. In this unit, air is drawn at low velocity from all four sides over heating elements of large area, and then is directed by the fan into the space being heated.

Features claimed for the equipment include a circulation of a large volume of heated air, production of a uniform temperature, and quiet fan operation. It also is pointed out that the equipment is light, compact, portable and yet sturdy and durable.

The unit heater is equipped with thermo cutout that automatically will open the heating circuit in case the blower does not operate. Inbedded circular type heating units are installed in the periphery of the fan. The elements are embedded in a refractory material under hydraulic pressure and are encased entirely in high temperature sheathing of chromium steel. A view of the equipment is shown in the illustration at the left.

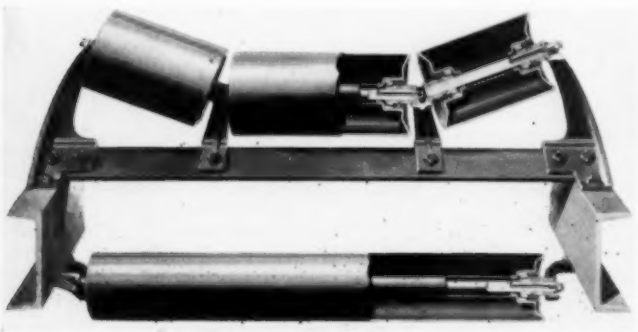
Gas-Electric Unit Drives Industrial Trucks

A gas-electric truck power unit, designed to replace storage batteries in electric trucks, recently has been developed by the Syntron Co., Pittsburgh. The unit consists of a 4-cylinder, industrial type, gasoline engine direct connected to a generator of the same voltage and amperage characteristics as the battery in the truck. A view of the unit installed in a truck is shown in the illustration at the bottom of the page.

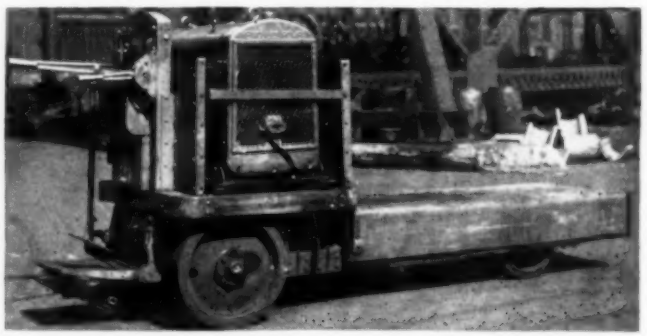
It is claimed that excess power is built into the generator and engine. Overheating is eliminated by using a proper size of engine, a thick radiator core, a centrifugal water pump, and a ball bearing fan sucking cold air through the radiator. The generator armature is supported in the front by the rear main engine bearing and at the outboard end in a heavy ball bearing. This rear ball bearing holds the heavy rotating armature in rigid alinement to eliminate possible brush and commutator trouble. The unit is 40 inches long 22 inches wide, and 28⅛ inches high. It weighs 840 pounds.

Wolf Is Made Sales Engineer in East

Fred E. Wolf has been made sales engineer of the Pangborn Corp., Hagerstown, Md., in the New England territory with offices at 19 Orchard Terrace, Arlington, Boston. Mr. Wolf was manager of the Pittsburgh office of that company for more than ten years.



Outer shells of the rolls are made of high quality steel tubing



View showing the gas-electric unit installed in the industrial type of truck

Pulmosan REG. U. S. PAT. OFF. AIR SUPPLIED

SAND BLAST HELMET

No. 64

A complete, comfortable covering for the entire head for protection against fine dust and particles. Air supply keeps fresh air inside helmet at all times. Furnished in two Models No. 64, $13.50 and No. 65 Made in Chrome Leather, $18.00. ***Write for further details.***

PULMOSAN SAFETY EQUIPMENT CORP.
176 Johnson St. BROOKLYN, N. Y.

« CERTIFIED »
STEEL ABRASIVES

ANGULAR STEEL GRIT

Grit abrasive acts like thousands of minute cutting tools. It does not disintegrate; it does not give off dust. Saves power, compressed air, and provides greater output.

Reg. U. S. Pat. Off.

SAMSON STEEL SHOT

Shot, being round, is intended for work that can be cleaned by shock. It works like numerous ball-pein hammers. Best results on rough work that does not require enameling, galvanizing or plating.

Reg. U. S. Pat. Off.

While "Certified" Abrasives cost more per ton than ordinary abrasive, the cost per job is decidedly less—and health hazards reduced to minimum.

We Invite a Test

Manufactured only by
PITTSBURGH CRUSHED STEEL CO., PITTSBURGH, PA.
STEEL SHOT AND GRIT CO., AMESBURY, MASS.

"Certified" Steel Abrasives are recommended by leading Blast Cleaning Manufacturers

MOGUL

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Made by an Original and Unique Process

▼

For Better Castings at Lower Cost

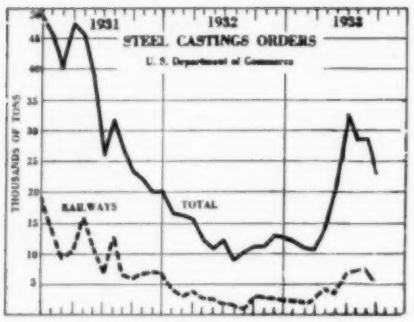
MOGUL has proved exceptionally efficient for cores requiring green bond and for all conditions where green bond is a factor. Cores do not sag or swell, they come clean from core boxes—and have the right porosity for free venting.

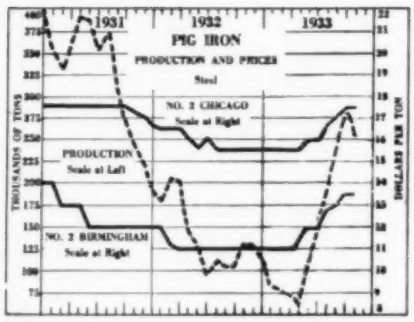
MOGUL is a perfect green sand bond for facings—it produces maximum strength yet simultaneously gives natural vents in the sand.

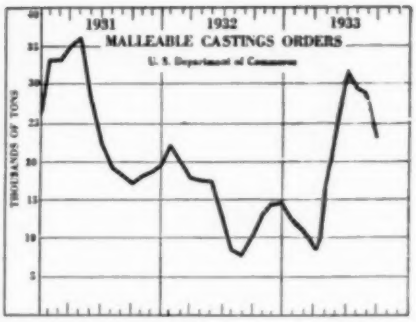
Let us prove it's best—test it!

▼

CORN PRODUCTS REFINING CO.
17 Battery Place New York, N. Y.







Foundry Activities

Reflect Industrial Trends

BLACKBURN FOUNDRY CO., St. Bernard, Cincinnati, O., recently was organized and has taken over the Elmwood Castings Co. on Murray Road and Big Four. S. M. Blackburn is president, E. F. Rogers, vice president and plant manager, A. C. Pletz, secretary and general manager, and P. E. Kline treasurer.

* * *

Barium Steel Corp., recently organized, has bought the plant formerly operated by the Canton Steel Foundries Co., Canton, O.

* * *

Plant of the Zanesville Malleable Iron Co., Zanesville, O., recently was purchased by the city. B. C. Zurhas, of Martins Ferry, owner of the Artcraft Stove Co., is reported negotiating for a lease on a portion of the building for a factory.

* * *

Central Specialty Co., Ypsilanti, Mich., recently has developed a new aluminum hot air heater for the Ford V-8 line of cars and trucks.

* * *

Independent Stove Co., Owasso, Mich., recently reported the best business in the past 2 years, with 125 men working 6 days a week. J. Edwin Ellis is president.

* * *

Mueller Co., Decatur, Ill., manufacturer of brass and iron plumbing supplies, water and gas valves, is erecting a $250,000 plant in the Hostetter industrial district, Los Angeles, to be in production by Dec. 1.

* * *

Wathey Foundry Co., Cleveland, recently has been organized by Arthur Wathey, formerly connected with the Bowler Foundry Co., Cleveland. The company has leased the old foundry of the American Shipbuilding Co., on Center street, and is equipping the plant to start production in a short time. H. Selway Wathey, is secretary-treasurer of the new company.

* * *

General Brass Foundry Corp., 1364 West Randolph street, Chicago, has been incorporated to manufacture metal castings by William J. Cerny, 139 North Clark street, Chicago.

* * *

Tonnage of gray iron castings produced during September in the Philadelphia federal reserve district, was 4.4 per cent less than in August according to a report of the Industrial Research department of the University of Pennsylvania. In spite of this decline, output was more than 70 per cent above that of the corresponding period of last year.

* * *

Indianapolis Malleable Iron Co. Inc., 546 North Holmes avenue, Indianapolis, has been incorporated to manufacture iron castings, by S. C. Wasson, R. S. Davis and Earl Buchanan.

* * *

Anderson Engine & Foundry Co., Anderson, Ind., recently has reported a definite improvement in business. Demands for parts for diesel engines have increased markedly. W. E. Cooney is president and general manager.

* * *

Donaldson Iron Co., Emaus, Pa., celebrated its 50th anniversary on Oct. 13. The present officers of the firm are George Castor, Emaus, Pa., president; John F. Saeger, Allentown, Pa., vice president, and John M. Gilbert, Allentown, secretary and treasurer.

* * *

Advance Stove Works, Evansville, Ind., recently resumed full time production under reorganized management. William H. Boetticher is president, F. L. Erlbacher is vice president, J. Stuart Hopkins secretary-treasurer and L. H. Boink assistant secretary.

* * *

Plant of the South Side Malleable Castings Co., 2700 South Nineteenth street, Milwaukee, damaged by fire several months ago, will be rehabilitated at once. Klug & Smith Co., 111 East Wisconsin avenue, Milwaukee, will handle the work as engineers and contractors.

RAW MATERIAL PRICES
Nov. 8, 1933

Iron	
No. 2 foundry, Valley	$17.50
No. 2 Southern, Birmingham	13.50
No. 2 foundry, Chicago	17.50
No. 2 foundry, Buffalo	17.50
Basic, Buffalo	16.50
Basic, Valley	17.00
Malleable, Chicago	17.50
Malleable, Buffalo	18.00
Coke	
Connellsville beehive coke premium	$5.00
Wise county beehive coke	3.50 to 4.25
Detroit by-product coke	8.00
Scrap	
Heavy melting steel, Valley	$12.50
Heavy melting steel, Pitts	11.25 to 11.75
Heavy melting steel, Chicago	8.50 to 9.00
Stove plate, Buffalo	8.50 to 9.00
Stove plate, Chicago	6.00 to 6.50
No. 1 cast, New York	7.00 to 7.50
No. 1 cast, Chicago	7.75 to 8.25
No. 1 cast, Pittsburgh	11.00 to 11.50
No. 1 cast, Philadelphia	12.00
No. 1 cast, Birmingham	9.00 to 9.50
Car wheels, iron, Pittsburgh	10.50 to 11.00
Car wheels, iron, Chicago	9.00 to 9.50
Railroad malleable, Chicago	9.25 to 9.75
Malleable, Buffalo	10.00 to 11.00
Nonferrous Metals	**Cents per pound**
Casting copper, refinery	7.75
Straits tin	51.60
Aluminum, No. 12, producers	19.00 to 22.00
Aluminum, No. 12 remelt Cleveland	12.00 to 12.50
Lead, New York	4.30
Antimony, New York	6.70
Nickel, electro	35.00
Zinc, East St. Louis, Ill.	4.30

NO WARPING

MOLTRUP

NO BUCKLING

Flattened Steel Plates

Moltrup's all-steel, perforated Bottom Plates, Pattern Plates and Core Plates are made permanently flat by a special process.

CUT YOUR COSTS BY USING MOLTRUP'S FLATTENED STEEL PLATES. THEY INSURE MORE PERFECT CASTINGS. The perforations permit free venting and they positively will not warp or buckle. The fine finish on Moltrup's plates enables you to put them into service immediately upon receipt—no machining or polishing necessary.

Moltrup's plates are made in any size, shape or thickness.

Write for specification sheet.

BRANCH OFFICES:

NEW YORK CITY—Moltrup Steel Products Co., 702 Chrysler Bldg.
PHILADELPHIA, Pa.—Moltrup Steel Prod's Co., 433 W. Sedgwick St.
CLEVELAND, Ohio—Tappenden & Davis, 4500 Euclid Ave.
SAN FRANCISCO, Calif.—J. J. Brady, 7 Front St.
HOUSTON, Texas—W. P. Cunningham, 910 Rice St.
PITTSBURGH, Pa.—McKee-Oliver Inc., 1326 West Carson St.
ATLANTA, Ga.—C. W. Moore, 1545 Westwood Ave., S. W.
NORFOLK, Va.—R. E. Murray & Co., 700 Front St.
SEATTLE, Wash.—M. M. Mossman, 2712—4th Ave. S.
DETROIT, Mich.—Moltrup Steel Products Co., 810 Stephanson Bldg.
BUFFALO, N. Y.—N. D. Tilbury, 307 White Bldg.
BOSTON, Mass.—C. H. Dayton, 23-25 Purchase St.
ERIE, Pa.—MacInnes Steel Sales Co., 1326 W. 30th St.

SALES AGENCIES:

CHICAGO, Ill.—Central Steel & Wire Co., 4545 Southwestern Blvd.
DAYTON, Ohio—Central Steel & Wire Co., E. Monument Ave., Ext'd
DETROIT, Mich.—Central Steel & Wire Co., 5035 Bellevue Ave.

MOLTRUP STEEL PRODUCTS CO.
Beaver Falls, Pa.

LAVA

Peak Service through Uniformity with AUTOMATIC MACHINE CONTROL CRUCIBLES

LAVA CRUCIBLE COMPANY OF PITTSBURGH, Pittsburgh, Pa.

Sales Representatives:

The S. Obermayer Co., Chicago (Warehouse), Cincinnati, Milwaukee; Springfield Facing Co., Newark, Springfield; M. A. Bell Co., St. Louis; Snyder Foundry Supply Co., Los Angeles, Calif.
Canadian Foundry Supplies & Equipment, Ltd.
Montreal (Warehouse) Toronto (Warehouse)

CRUCIBLES

"Every Refractory For The Foundry"

GLOBE SHOT

H.C. CHILLED GLOBE SHOT
Reg. U. S. Pat. Off.

Cuts Cleaning Costs!

Every saving counts now when costs must be cut to meet conditions. Why let the other fellow with lower cleaning costs have the advantage over you in figuring selling prices?

One ton of Globe shot in most cases will convince you that shot-blasting is the low-cost way to clean castings, whether grey iron, malleable or steel.

Write us for samples and data that *shows* you why Globe Shot will save you money.

CORRECTED STEEL GLOBE GRIT
Reg. U. S. Pat. Off.

The GLOBE STEEL ABRASIVE CO.
Dept. F
Mansfield, Ohio

New Trade Publications

BELT IDLERS—Jeffrey Mfg. Co., Columbus, O., recently has published bulletin No. 569 illustrating and describing the important features of its new line of belt idlers. List prices and dimensions of the various types of idlers are included.

CASTINGS—A bulletin illustrating numerous types of castings which it produces, recently has been distributed by the Liberty Foundry Inc., Milwaukee.

TRIMMER—Oliver Machinery Co., Grand Rapids, Mich. recently has published a folder illustrating and describing its new equipment for trimming various ends and angles. The equipment is a precision tool which has been designed particularly for the pattern shop.

REFRACTORIES.—A description of each refractory product made by the Standard Fuel Engineering Co., Detroit, is contained in a recent folder issued by that company. Information on where and how to use these refractory products also is given.

SCOPOMETRY—A new method of colorimetric and turbidimetric measurements known as scopometry is illustrated and described in a recent folder of Bausch & Lomb Optical Co., Rochester, N. Y. Colorimeters also are discussed.

DUST ARRESTERS — Pangborn Corp., Hagerstown, Md., has issued a bulletin discussing its new all metal dust collector, as well as giving information on the type of bag used and the positive rapping mechanism employed in the unit.

AIR COMPRESSORS — Ingersoll-Rand Co., 11 Broadway, New York, recently has published a 16-page booklet illustrating and describing its new type of air compressor which is air cooled and has a built-in electric motor. Illustrations show distinctive features, construction and installations of the compressor.

ABRASIVE CLEANING—American Foundry Equipment Co., Mishawaka, Ind., has issued a new bulletin illustrating and describing its airless Wheelabrator, a new method of abrasive cleaning. The abrasive in this machine is ejected from a specially designed and constructed wheel, and cleans the work which passes beneath.

RUBBER GUIDE BEARINGS—An 18-page booklet entitled "Cutless Rubber Guide Bearings As Applied to Hydraulic Turbines" recently has been published by the B. F. Goodrich Rubber Co., Akron, O. The material was prepared by R. E. B. Sharp, hydraulic engineer, Baldwin-Southwark Corp., I. P. Morris division, Philadelphia.

HARDENING—The vapocarb hump method for hardening is discussed in a recent bulletin of the Leeds & Northrup Co., 4901 Stanton avenue, Philadelphia. It is pointed out that the method brings the quench point, the rate of heating and finally the furnace atmosphere under complete control to produce correct hardening. The bulletin gives directions for operating under the method.

CHIPPING HAMMERS—Four sizes of chipping hammers are illustrated in a bulletin recently published by the Dallett Co., 165-189 West Clearfield street, Philadelphia. Chipper repair parts are illustrated and a second bulletin gives information on metalworking chisel blanks for use with the chipping hammers made by that company.

INSTRUMENTS—New portable electric instruments, including voltmeters, milliammeters, ammeters and wattmeters, especially designed for alternating current measurement, but which also will serve satisfactorily in many applications for direct current measurement, are described in a bulletin recently issued by the General Electric Co., Schenectady, N. Y.

PRESSURE GAGES—Brown Instrument Co., Philadelphia, has published a new catalog featuring its new thermometer and pressure gages, which are available in indicating, recording and controlling types. The new automatic control thermometers and pressure gages described are operated by mercury-in-glass switches to eliminate relays and exposed contacts.

COMPRESSORS—Worthington Pump & Machinery Corp., Harrison, N. J., has published three booklets dealing with portable compressors having displacements of 120, 310 and 360 cubic feet, respectively. The bulletins show construction of the units, various mountings which may be employed, and tools which may be used where compressed air is available. Specifications of each unit also are presented.

PRESSURE INSTRUMENTS—Foxboro Co., Foxboro, Mass., has published its bulletin No. 185 dealing with recording, controlling and indicating pressure instruments. The catalog is well illustrated showing the construction of the various types of instruments, giving information on pressure charts, methods of mounting, types of cases, and gage accessories. Recording gage drilling dimensions also are included.

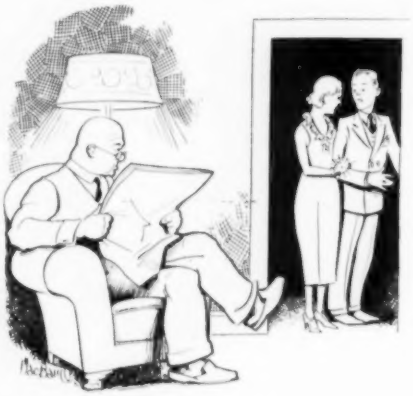
ALUMINUM AND ITS ALLOYS—Aluminum Co. of America, Pittsburgh, has published a 72-page booklet entitled "Alcoa Aluminum and Its Alloys" which is devoted to the presentation in concise form of some of the fundamental information concerning the alloys produced by that company. A special section is devoted to casting alloys in which information is presented on permanent mold castings, heat treated castings, die castings, and sand castings.

PULVERIZED COAL. — Application of pulverized coal to melting and annealing furnaces in the foundry is described in an 8-page folder recently published by the Whiting Corp., Harvey, Ill. The advantages which the company claims can be secured through the use of that type of fuel are discussed, and illustrations show powdered fuel installations in connection with air furnaces, car type annealing ovens and steam boilers.

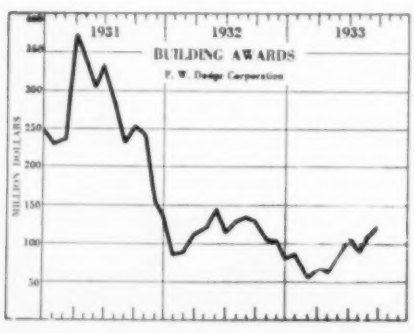
PHOTOELECTRIC RELAYS—General Electric Co., Schenectady, N. Y., has issued a 16-page bulletin discussing advantages offered by photoelectric relays for certain control problems. It is pointed out that several forms of photoelectric relays are available to meet various conditions of application, including devices to operate from alternating current supply lines, to operate from direct current supply lines, designed for outdoor service and designed for high-speed response and high sensitivity.

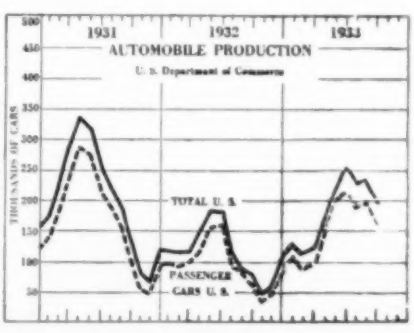
OPTICAL INSTRUMENTS—Bausch & Lomb Optical Co., Rochester, N. Y., is distributing a catalog on a contour measuring propector, a precision optical instrument for the inspection of small contour forms. The projector throws a highly magnified image of the profile of the part under investigation on a chart or screen. An error of only a thousandth of an inch appears a quarter of an inch in size under a magnification of 250 diameters, and an error of one ten-thousandth is readily discernible.

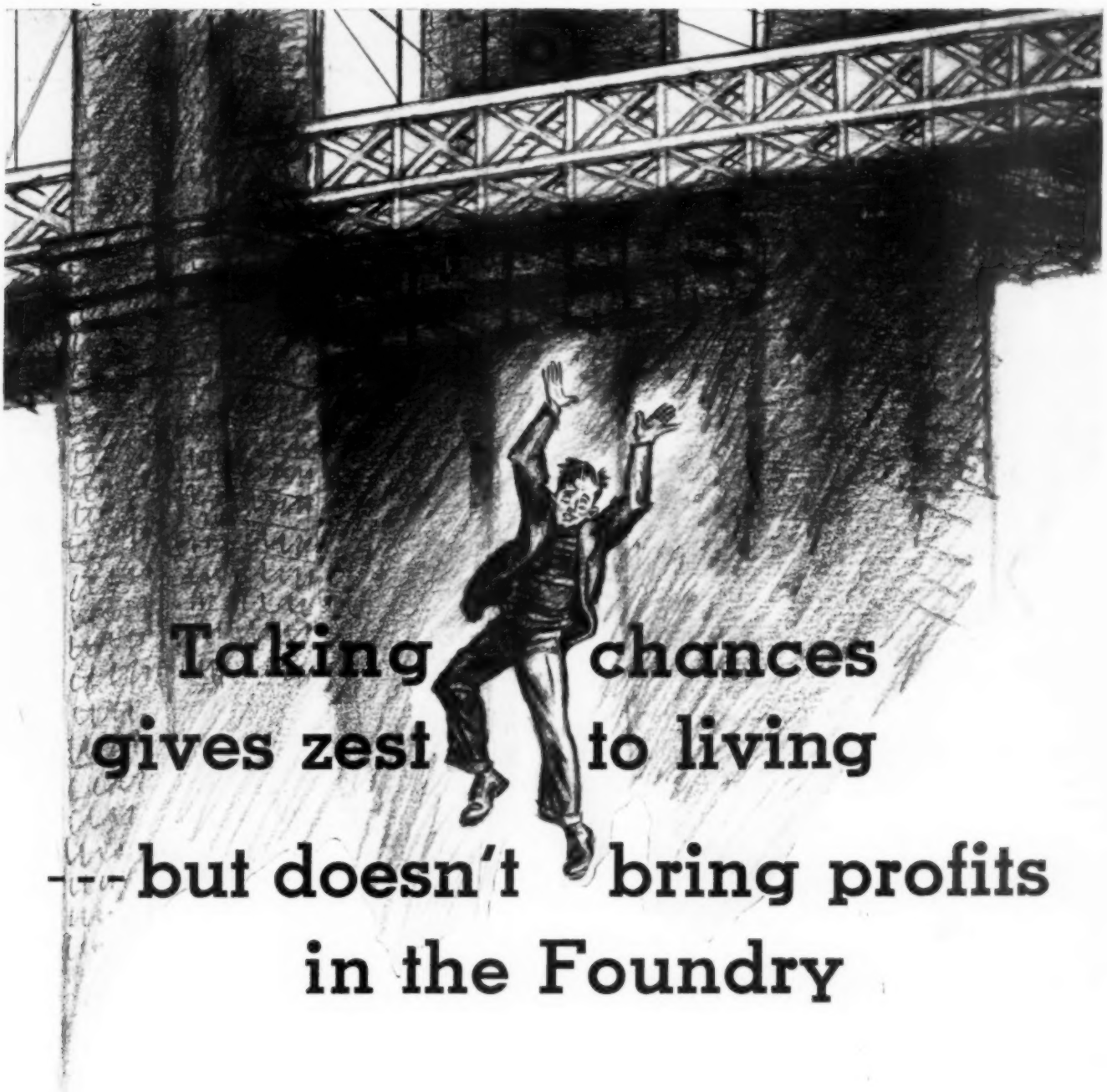
Faked Foundry Facts



Drawback







Taking chances gives zest to living

---but doesn't bring profits in the Foundry

TAKING chances with casting quality costs the foundryman real money. The profit on several perfect castings can be eaten up by the loss on one reject. Many foundrymen are cutting down rejections to almost nothing and largely eliminating the gambling element from their foundry operations by using Mayari Pig Iron.

The addition of a small percentage of Mayari to the cupola mixture makes it practically certain that the castings will be easily machinable to a smooth, highly wear-resisting surface, even on a thick section, that they will have a fine, close grain, and be free of blow-holes, spongy spots and other imperfections. In short, they'll be the kind of castings that cement the goodwill of customers.

That's one use for Mayari—to give all-round high quality to castings. It has another use, equally important: to make fine alloy-iron castings.

Mayari is a natural nickel-chromium alloy pig iron, and is unsurpassed as a means of introducing these elements to produce castings of great strength, toughness, heat and wear-resistance. Of course, when Mayari is used for this purpose the general improving effects are obtained also.

About cost. As, in most cases, only a small percentage of Mayari has to be used to obtain the desired results, the increased cost is so low as to be negligible. *Bethlehem Steel Company, Bethlehem, Pa.*

BETHLEHEM STEEL

Mayari

CUPOLA ALLOYS

need INTERFERENCE, too

EXPECTING an unprotected alloy to reach the melting zone of a cupola uncontaminated is like expecting a fullback to make a touchdown without interference. It can be done, but with no high average of success.

But when you add silicon, manganese, or chromium in the form of E. M. Briquets, oxidation cannot "take it out of the play" because a refractory binder sheathes the alloy until it reaches the hottest zone. Then the binder disintegrates and releases the alloy at the point where it does the most good.

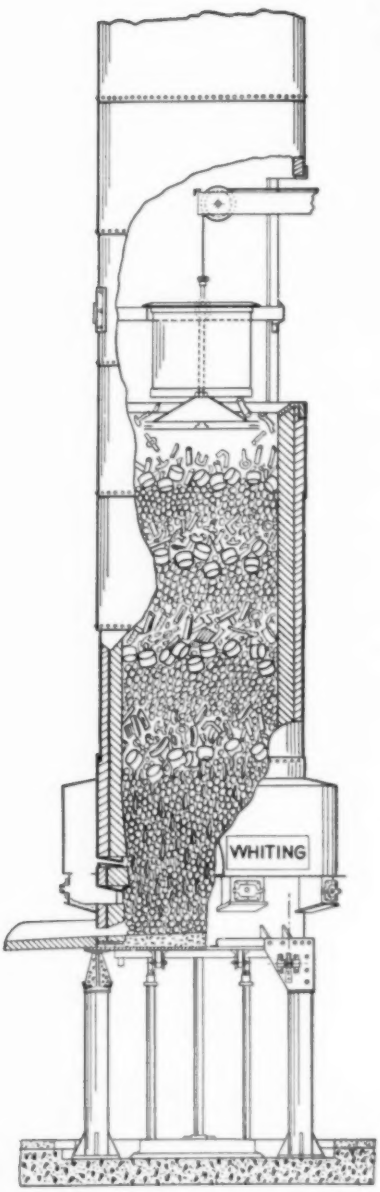
Each E. M. Briquet contains a fixed amount of silicon, manganese, or chromium, which is delivered without loss to the iron. As a result, recovery is higher and off-iron is prevented. If you want to simplify foundry practice and produce better castings at lower cost, ask Electromet Engineers to explain how E. M. Briquets can help you. A request today will bring you complete information.

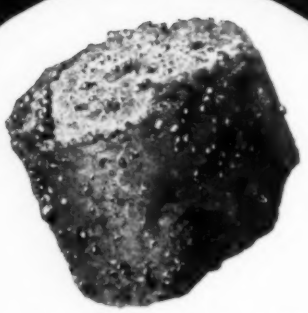
Electromet
Ferro-Alloys & Metals

ELECTRO METALLURGICAL SALES CORP.
Unit of Union Carbide and Carbon Corporation

UCC

CARBIDE and CARBON BUILDING, 30 EAST 42nd ST., NEW YORK, N. Y.





This E. M. BRIQUET was removed just before entering the melting zone and shows how the alloy is protected from oxidation during its descent through the upper oxidizing zone of the cupola.